Indian American whiz kids, an update

I had drawn attention earlier[1] to the extraordinary and outstanding performance of Indian American children in three prestigious contests open to all school children in the United States: the National Geographic Bee, Intel Science Talent Search and Scripps National Spelling Bee. The winners in each of them are awarded very handsome scholarships besides other items. That report covered up to 2014. Here, the performance of the Indian American school children in these three contests in the next two years (2015 and 2016) is presented.

The National Geographic Bee. In 2015 and 2016, the top three places were won by Indian American children and they also won 7 of the top 10 positions (Box 1). Of the 54 State Champions, 20 and 23 are Indian Americans in 2015 and 2016 respectively.

Taking these results with those of earlier years[1], in the 11-year period (2006 to 2016), the first place was taken by Indian American children in 8 years, the second place in 8 years including the 3 years in which they did not win the first place and the third place in 7 years.

Each year, almost three million students from about 11,000 schools in the US participate in the National Geographic Bee.

The Science Talent Search. This contest, started in 1941 with the sponsorship of Westinghouse shifted in 1998 to Intel and in 2016 to Regeneron. Another change in 2015 from the earlier years was that the contest was split into three broad areas: Basic Research, Global Good and Innovation and the 40 finalists compete in one of these three themes.

The performance of Indian American kids in 2015 and 2016 (Box 2) is impressive. In 2015, Indian American high school seniors won second place in Innovation and third place in Basic Science and Global Good. Their record improved in 2016, with all the three top positions in Basic Research and in Innovation taken by Indian American children. But they do not show up in the Global Good category. Why? Is it because they are not innovative or motivated or is it because their parents did not encourage or support them in that direction? Also, 11 in 2015 and 13 in 2016 Indian American children are among the top 40 finalists. These are indeed outstanding achievements.

Of the 1844 high school seniors who entered this contest, 300 became semifinalists and 40 emerged as finalists, based on a critical review of their projects. The finalists share over a million dollars in awards, with the top ones given $150,000 each.

The Scripps National Spelling Bee. The top ten finalists in the Scripps National Spelling Bee in 2015 and 2016 (Box 3) include seven Indian American children in each year. In addition, Indian American students won the two top positions in both years. It may be noticed that every year from 2008 to 2016, the top position has been won by Indian American children. Another interesting feature is that for three years in a row (2014, 2015, 2016), two contestants shared the top position. Some of the other top positions were also shared by two or more persons. Another notable feature is that Indian American siblings were first place winners in different years: Kavya Shivashankar in 2009 and Vanya Shivashankar in 2015; Sriram Hathwar in 2014 and Jairam Hathwar in 2016. Nihar Janga, who shared the championship in 2016 is one of the youngest winners at age 11 years. A remarkable contestant among the finalists in the National Spelling Bee of 2016 was 6-year-old Akash Vukoti, who was the first grader in the National Spelling Bee history, and who could not even reach the microphone but thrilled the entire audience[2].

The results of 2015 and 2016 for these three prestigious contests reinforce the

Box 1. Indian American children among top ten finalists in the National Geographic Bee

2016	Rishi Nair (1st), Saketh Jonnalagadda (2nd), Kapil Nathan (3rd), Rishi Kumar, Pranab Varada, Samanyu Dixit, Ashwin Siva Kumar.
2015	Karan Menon (1st), Shriya Yarlagadda (2nd), Sojas Wagle (3rd), Kapil Nathan, Abhinav Karthikeyan, Shreyas Varathan, Tejas Badgujar

Box 2. Indian American children among the top ten finalists in the Science Talent Search

Year	Basic Research	Global Good	Innovation
2016	Amol Punjabi (1st) Meena Jagadeesan (2nd) Kumar Shroff (3rd)		Maya Varma (1st) Milind Jagota (2nd) Kavya Ravichandran (3rd)
	Sanath Devalapurkar, Vikul Gupta, Anjini Karthik, Yashaswini Makaram, Shreya Menon, Pranav Srinivas, Sreya Vemuri add up to 13 Indian American children among the 40 finalists.		
2015	Sheshwat Kishore (3rd)	Anvita Gupta (3rd)	Saranesh Prembabu (2nd)
	Eswar Ananda Padmanabhan, Soumya Khare, Rohith Kuditipudi, Kriti Lall, Dharivat Nitin Pandya, Reesab Pathak, Anika Raghuvanshi, Tanay Tandon add up to make 11 Indian American children among the 40 finalists.		

Box 3. Indian American children among the top ten finalists in the National Spelling Bee

2016	Jairam Hathwar (1st), Nihar Saireddy Janga (1st), Snehaa Ganesh Kumar (3rd), Smrithi Upadhyayulu (5th), Rutvik Gandhasri (6th), Sreekanth Vogoti (7th), Jashun Paluru (10th) make up 7 out of the top ten winners.
2015	Vanya Shivashankar (1st), Gokul Venkatachalam (1st), Snehaa Ganesh Kumar (4th), Dev Jaiswal (4th), Siddharth Krishna Kumar (4th), Tejas Muthuswamy (7th), Siyana Mishra (9th) make up 7 out of the top ten winners.

points highlighted in the earlier report[1] about the heart warming performance of Indian American children. As earlier, a number of girls took top positions. The Prime Minister of India, Narendra Modi, made a reference to the superb performance of the Indian American children in these very competitive contests, in his address to the US Congress on 6 June 2016.

1. Subbarao, E. C., *Curr. Sci.*, 2014, **107**(3), 338–340.

2. Shapira, Ian, *The Washington Post*, 26 May 2016.

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MEETING REPORT

The third P. J. Paul memorial combustion researchers meet*

The third combustion researchers meet was held in Vikram Sarabhai Space Centre (VSSC) at Thiruvananthapuram during 27 and 28 February 2016, following the second successful meeting that took place at a beach resort in Chennai[1]. The tradition of getting faculty and scientists in R&D institutions *on an invited basis*, to discuss in-progress parts of combustion science practiced in the academic environment and problems of development in defense and aerospace industry was continued this year as well with much wider and deeper interest by the participants. The aim of creating a conducive environment for learning from each other and allowing the students to relate the research practiced in their environment with developments seemed a well worth the idea because many students participated in this workshop. The current meet had 29 presentations from faculty and scientists with 6 student presentations. Selected highlights are set out below.

The first talk was presented by Sujith (IITM) on using theory of complex networks in thermo-acoustics; the basic idea being that acoustic signals from flowing fluids contain the nature of the local flow field and such signals when subject to select analysis may reveal the flow behaviour. Much discussion followed. Establishing the value of such analysis on the basis of conservation equations was suggested as being important. Sundararajan (IITM) spoke of the use of genetic algorithms in optimizing the performance parameters of liquid rocket engines. He described how the best operating conditions within the constraints given could be arrived at using this algorithm. Varun Shivakumar (IITM) spoke of a model of heterogeneous quasi-1D model for composite solid propellants that was shown to predict the burn rate behaviour of a large number of propellants. The principal features of the new qualsi-1D model were elucidated and the features that give confidence in making good predictions were brought out. Joseph Mathew (IISc) presented the progress on LES by explicit filtering for problems of flows with shocks that are relevant to propulsion. The simulations of free supersonic jets, and jets impinging on wedge deflectors relevant to space launch vehicles were shown to be consistent with experimental results. Swethaprovo Choudhuri (IISc) presented the work on mitigating instability by subjecting the swirler in a combustor to a rotary motion such that the higher intensity turbulence and higher swirl number generated in the flame stabilization region might alter the flame position, structure and thereby mitigate thermo-acoustic instabilities. Several techniques, such as particle image velocimetry, high speed, intensified, chemi-luminescence imaging were utilized to observe the impact of swirler rotation rate on the dynamics of the unstable flame. The disruption of the flame–corner vortex interaction in outer recirculation zone due to an enhanced turbulent flame speed and increased swirl number are found to be responsible for the observed mitigation by the proposed strategy.

A. Mukhopadhyay (Jadavpur University) described the fundamental experimental and analytical studies on jet breakup phenomena pursued in his laboratory. The conclusion that these studies corroborate with linear stability is consistent with the literature. Srikrishna Sahu (IITM) spoke on the laser-based measurements related to droplet clustering in sprays with regard to their cause and consequence using a twin-fluid air-assist atomizer. The present work has obtained a comprehensive data set for droplet clustering statistics for different liquid mass loading (by varying the air and the liquid volume flow rates) on water spray. Krithika Narayanaswamy (IITM) spoke about chemical kinetic modelling of jet fuel surrogates using computational tools. The use of surrogates is to more accurately assess the role of specific components in jet fuels.

Bhaskar Dixit (Jain University) discussed the work he was doing on some puzzling situations encountered in diesel-on-water pool fire combustion along with his colleagues. Experiments with the combustion of a diesel layer over water for a long burn time of 30 to 45 minutes showed that after the main fire there was a long pause and an unexpected substantive flare-up. Studies on small pool fires showed that the relatively small density difference between diesel and water allowed some diesel to sink and this would surface later when the density of water came down due to heating and caused the flare up. A. T. Sriram (M.S. Ramaiah School of Advanced Studies, Bengaluru) presented the computational results on a model can-type combustor's flow field that consists of combinations of interesting elementary configurations like jet-in-cross-flow, opposed jets and swirl. He described the results of computations based on k-ω model for turbulence and eddy dissipation model for combustion.

*A report on the third P. J. Paul memorial combustion researchers meet held on 27–28 February 2016 at Vikram Sarabhai Space Centre, Thiruvananthapuram, India. The event was supported by VSSC, Liquid Propulsion System Centre (Thiruvananthapuram) and projects from Indian Institute of Technology (IIT), Chennai.