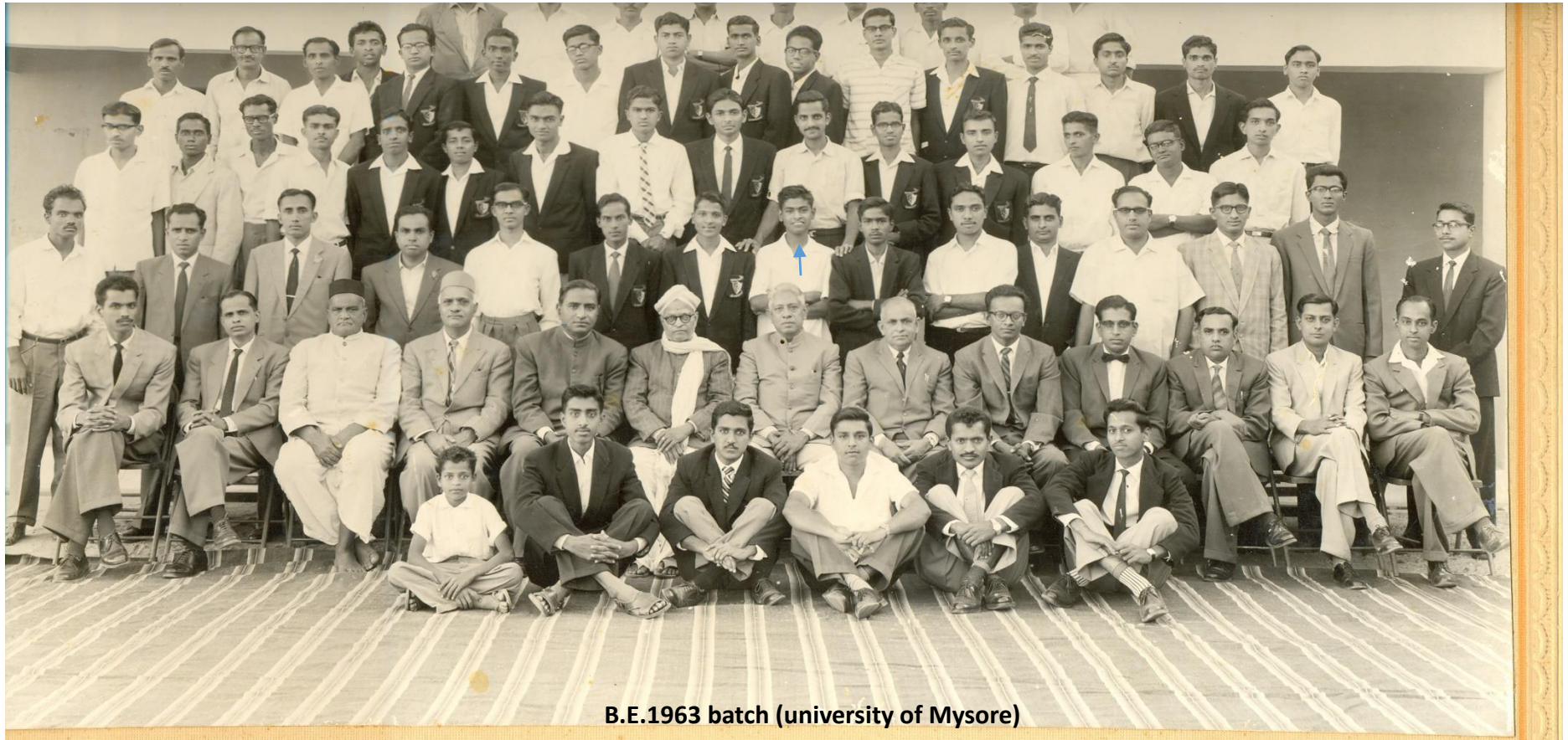
Professional
1969 - 2020



B.E.1963 batch (university of Mysore)

: (on Floor) L. to R.—Sriyuths D. V. Jagannath, N. R. Prakash, M. Y. Krishna Prasad, K. V. Prabhakar Rao (Convenor), K. V. Venkatachalapathy (Convenor).

: (on Chairs) L. to R.—Sriyuths Sampathkumaran, B.E., L. Srikantaiah (G.C.M.), G. R. Ramaiah (G.C.M.), Krishnaswamy (G.C.M.), Janaradana Iyengar (G.C.M.) G. C. Neelakantappa (President), Dattathri (G.C.M.), A. Seshappa (Principal), Dr. N. Krishnamurthy, M.S., P.hd., Satyanarayana Rao, B.Sc., B.E., M.S. K. M. Gundu Rao, B.Sc., (Hons.), D. Dhananjaya, B.E., S. R. Aprameya (Prof. of Mech. Engg.)

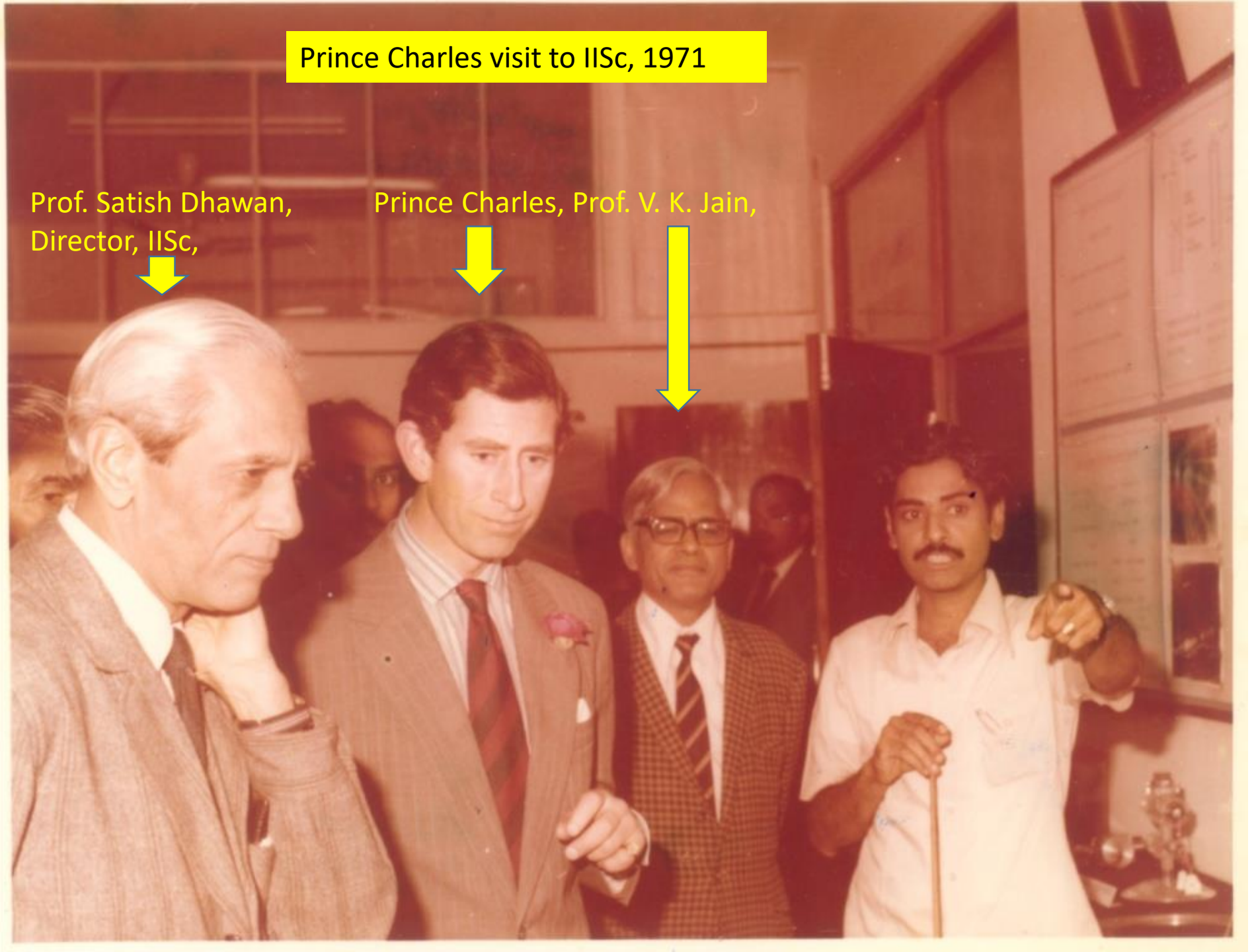
NG: 1st Row L. to R.—Sriyuths C. Puttaswamy, N. Rajagopal, B.E., B. N. Venkateshwara Rao, B.Sc., M.E., T. R. Nagaraj, B.Sc., B.E., Rangarajan, B.E., G. Venkatar B. P. Gopalakrishnaiah, H. S. Mukunda, D. N. Subbaramu, M. V. Nagaraja Rao, K. N. Sheshachalapathi, B.E., Ashwathnarayana Rao, B.E., Parthasarathy, B.E K. Vamanamurthy, M.Sc., N. B. Prabhakar, B.E.

G: 2nd Row L. to R.—Sriyuths C. S. Satyanarayan, C. Raju, Jayakannan, P. Prabhakara Rao, N. Sethuraman, N. Srinivasa Rao, Rangaswamy, M. P. Srinivas C. N. Subramanyam, N. Krishnamurthy, T. N. Lakshminarayan, K. Srinivasa, B. S. Subramanyam, M. S. Nagaraju, N. A. Pradyumna Rao

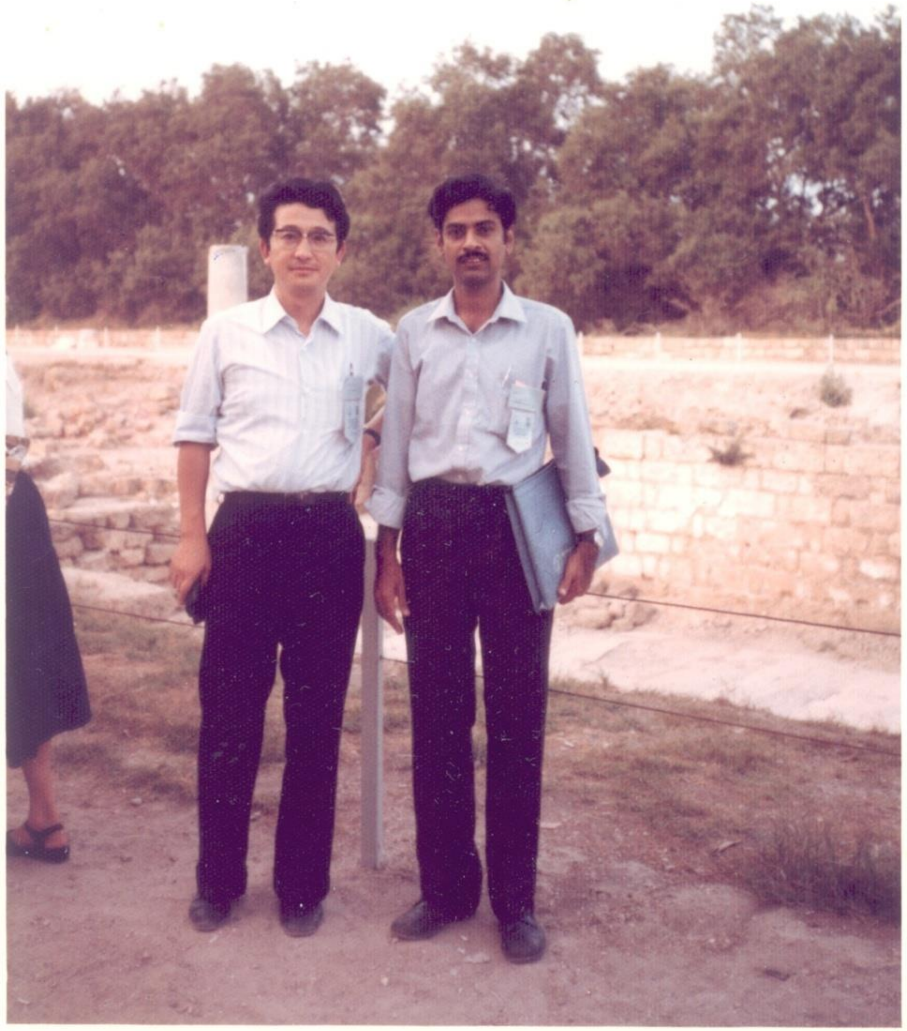
G: 3rd Row L. to R.—Sriyuths Rangappa, T. Ramaiah, N. S. Rama Rao, K. C. Basappa, K. Srinivasa, B. S. Srinivasan, Shankar, A. T. Bhasyam, P. R. Nagasriniv G. Anantha, Vasanth B. Prabhu, M. V. Nandakumar, Raghunatha Pai, H. N. Krishnaswamy, Krishnamurthy, S. Sampathkumaran.

G: 4th Row L. tr R.—Sriyuths Kalyan Sundarachar, Govinda Rao, G. P. Narasimhamurthy, Adishesh, Sheshadri Naidu, Biroji Rao, Srinivasa, M. P. Narayan H. B. Basavana Gowda.

Star Studio, My


Prince Charles visit to IISc, 1971
Prof. Satish Dhawan,
Director, IISc,
Prince Charles, Prof. V. K. Jain,

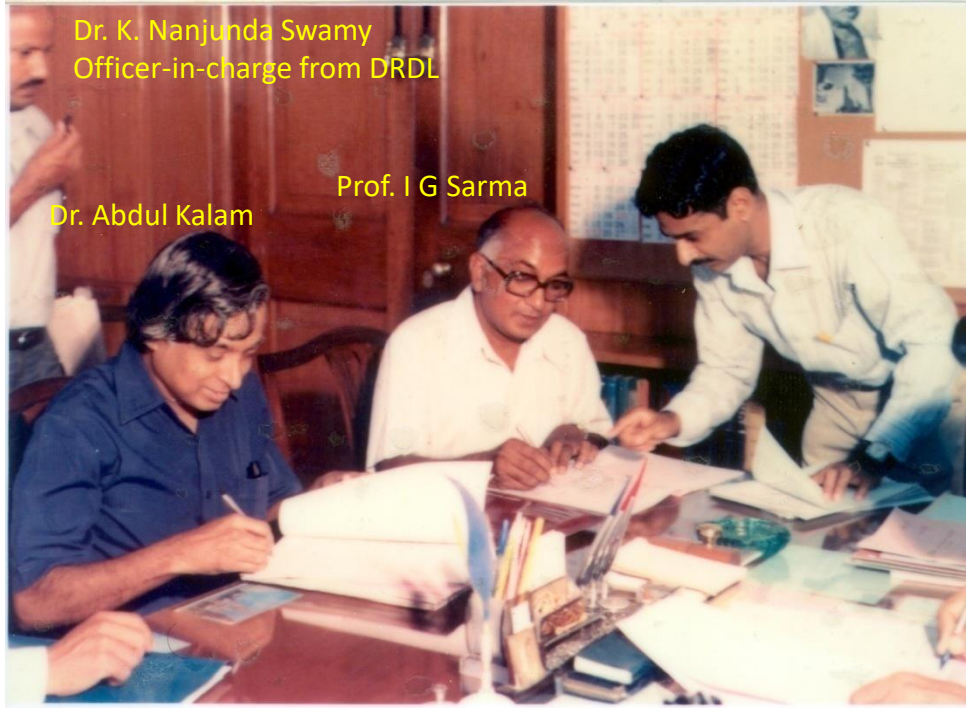
The 19th Symp on Combustion (international) –
With Prof. Satoshi Okajima near the dead sea in Israel
after the symposium at Technion, Haifa, Isarel, August 1982



At IISc guest house, 12 June 2015 when he visited IISc

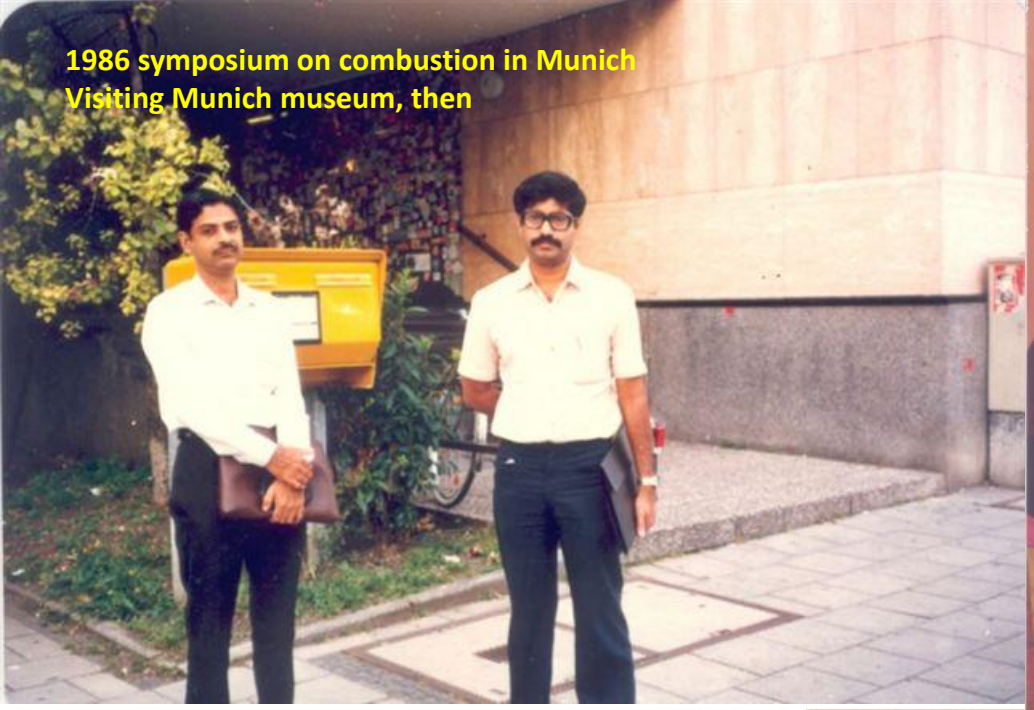
Visiting Prof. S. Okajima after the
Int. conf. computational mechanics
Along with Prof. A. G. Marathe, 1985

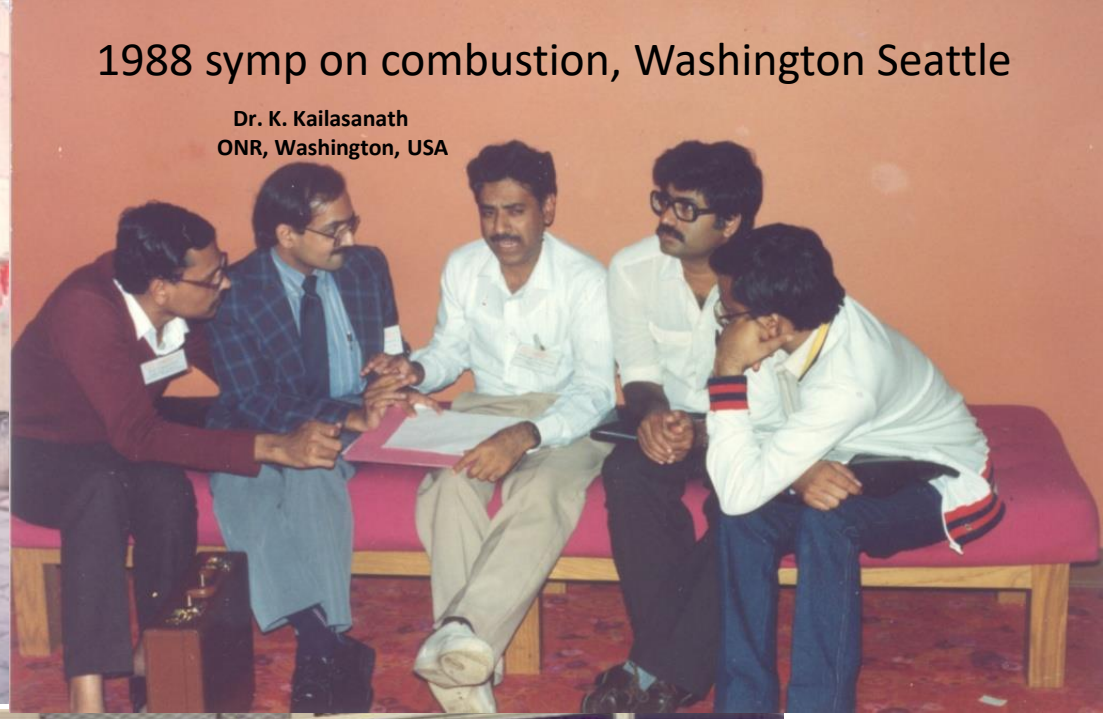
Prof. Okajima was deeply connected to India, more particularly, Prof. B. N. Raghunandan at IISc.
His daughter spent time for 6 months at IISc under "BNR's" care.

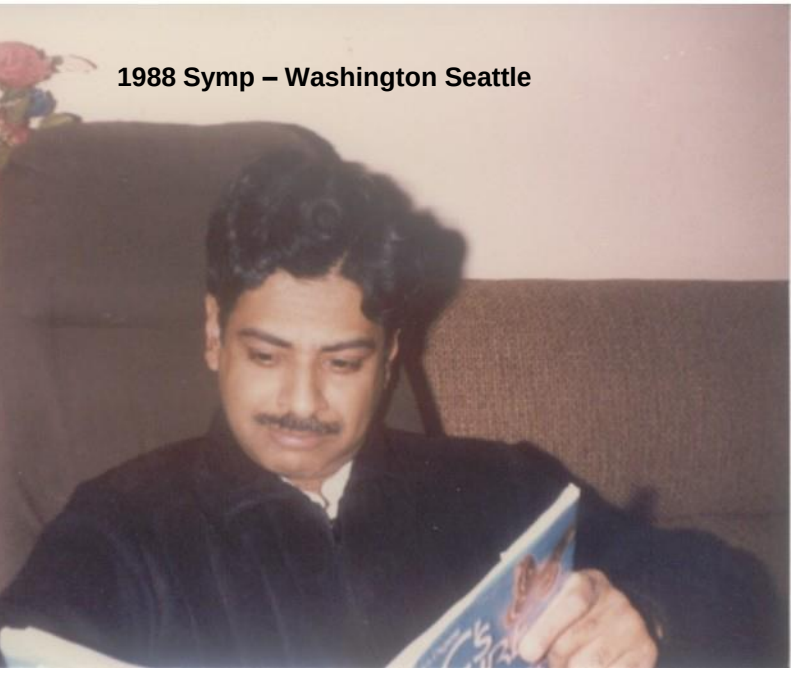


Beginning of JATP – Joint IISc-DRDL program
Dr. Abdul Kalam at top left; Prof. Ramaseshan top right - 1983

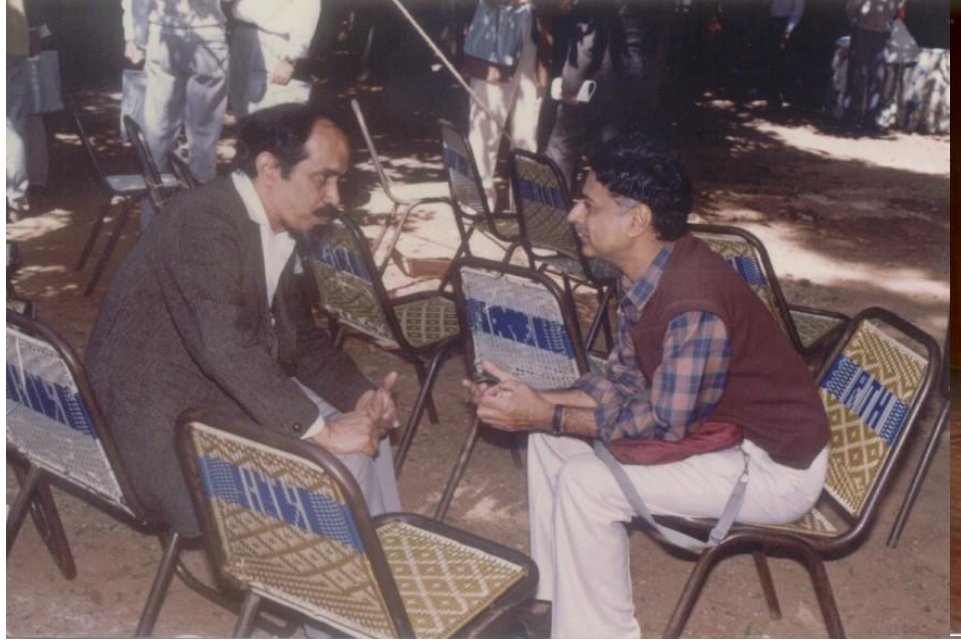
After 1984_Michigan_symposium
In Eindhoven


1986 symposium on combustion in Munich
Visiting Munich museum, then

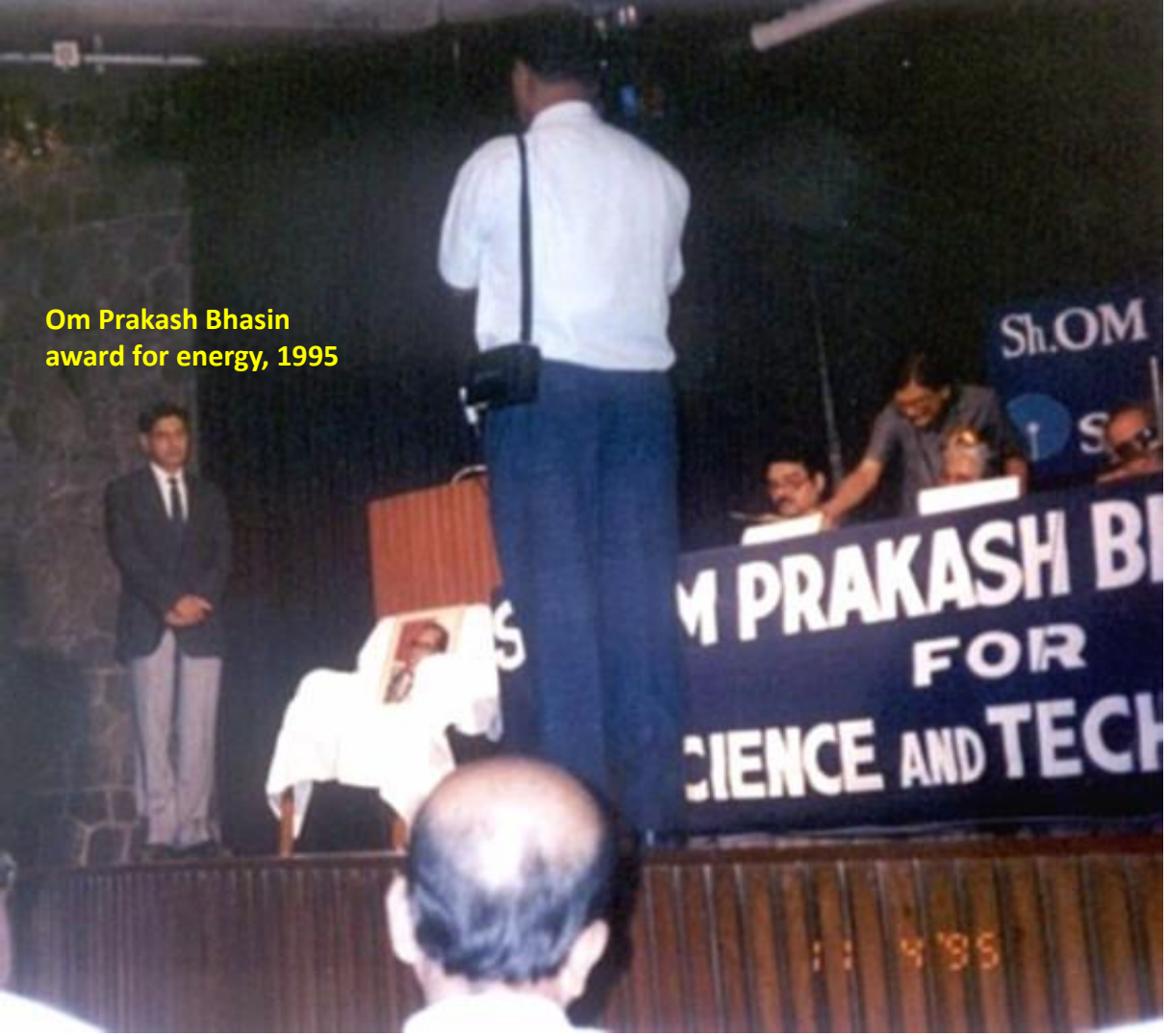

1988 symp on combustion, Washington Seattle
Dr. K. Kailasanath
ONR, Washington, USA


1988 Symp – Washington Seattle


1988 - K. S. Sreenivasan, B. N. Raghunandan,
G. Goel, P. J. Paul, H. S. Mukunda, K. N. Lakshmisha



1992 Conference at IISc



Om Prakash Bhasin
award for energy, 1995


ASTRONAUTICA
SEMINAR ON
LIQUID PROPULS


INAE Fellowship, 1998


Karnataka Rajyotsava Award 2003

Defence Research & Development Organisation
Ministry of Defence

ACADEMIC EXCELLENCE AWARD 2002

Prof HS MUKUNDA

Prof HS Mukunda, Indian Institute of Science (IISc), Bangalore, has made significant contribution for the development of Solid, Liquid and Ramjet Propulsion Systems for Integrated Guided Missile Development Programme. He has made several innovations in the Studies relating to Design, Analysis and Testing of Liquid Propellant Rocket Engine, fine tuning of gas generator and turbo pump for Prithvi Missile.. He has chaired a number of critical reviews for Design and Development of Liquid Propellant Rocket Engine, Ramjet Engine and Solid Propellant Rocket Engines. Currently he is instrumental in guiding and reviewing the Scramjet Engine Development for Hypersonic air breathing Vehicles.

In recognition of his valuable academic contribution in the field of Missile Propulsion, the **DRDO Academic Excellence Award 2002** is conferred on Prof HS Mukunda of IISc, Bangalore.

New Delhi
Date : 11 May 2003

(Dr. V. K. Aatre)
Scientific Adviser to Raksha Mantri


VALLABH VIDYANAGAR
JANUARY 23, 2003


NAMALAI UNIVERS
19th National Conference
on
IC Engines and Combustion
21-23 December 2005
Combustion Institute (Indian Section)
Organised by
culty of Engine and Technology
epartment of Me ical Engineering


ANNAMALAI UNIVERSITY
19th National Conference
on
IC Engines and Combustion
21-23 December 2005
Under the auspices of Combustion Institute (Indian Section)
Organised by
ANNAMALAI UNIVERSITY
AUMTEC-21


ANNAMALAI UNIVERSITY
19th National Conference
on
21-23 December 2005


Hearty Welcome to the Delegates of the
19th National Conference on
IC Engines and Combustion
21-23 December 2005
Under the auspices of
Combustion Institute (Indian Section)
Organised by
Faculty of Engineering and Technology
Department of Mechanical Engineering
Annamalai Un


To Prof. HS Mukunda, Adviser, CGPL, IISc, Bangalore
From Combustion Community of India
23 DEC 2005

Robert Maria Clement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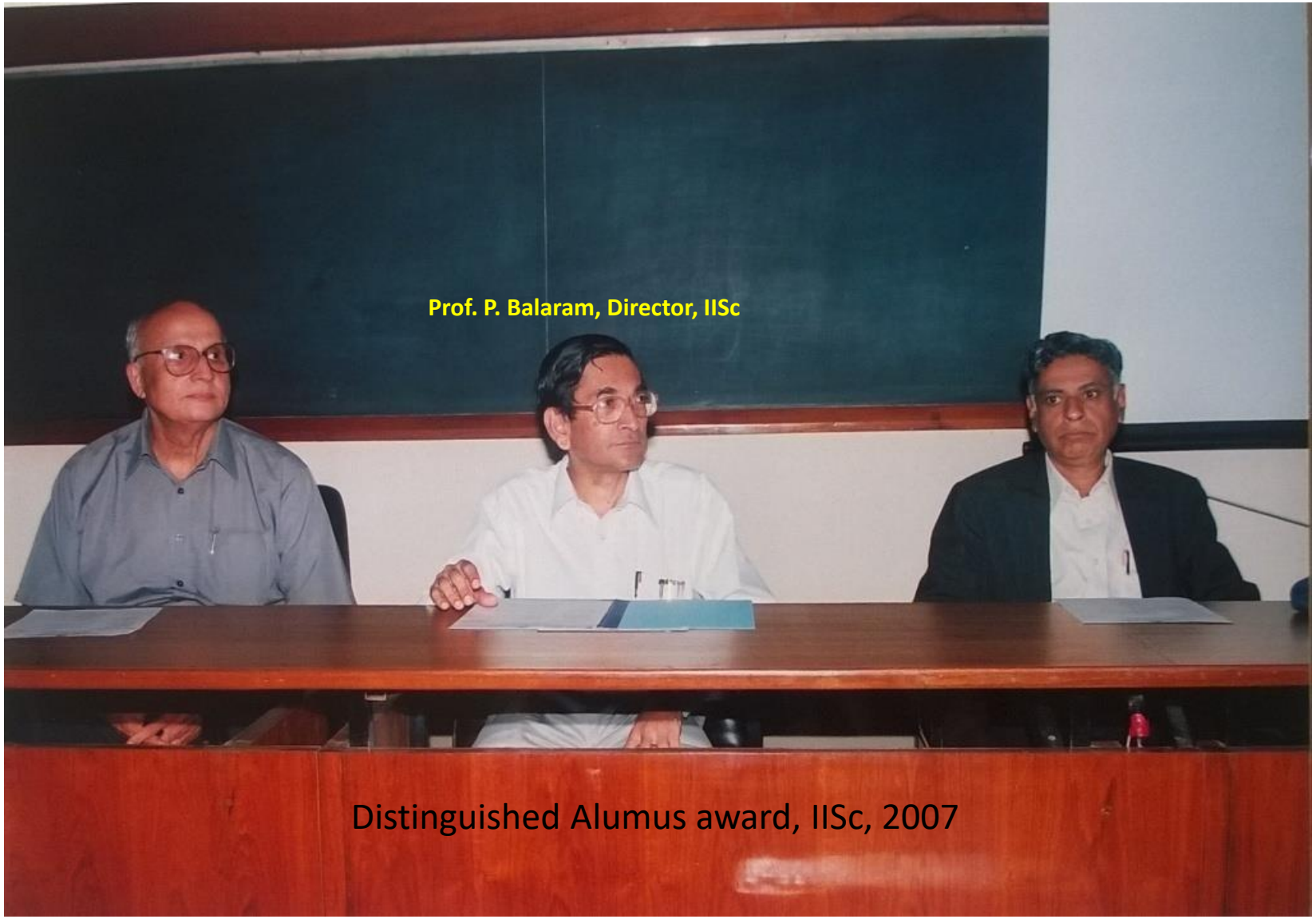
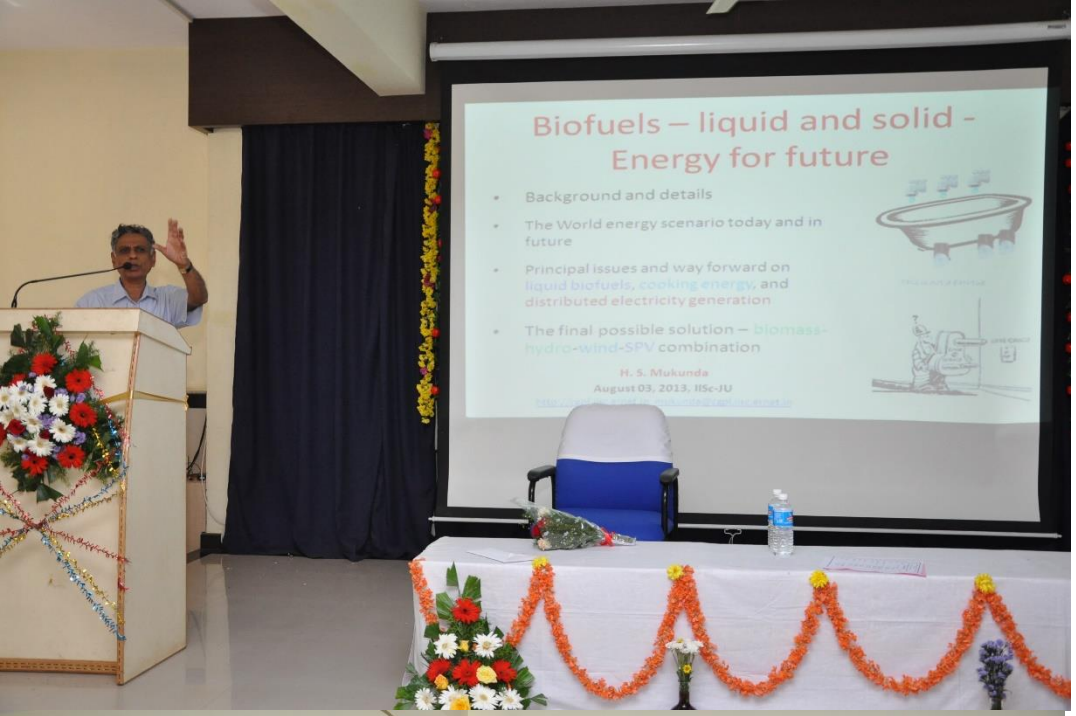


Distinguished Alumus award, IISc, 2007


Prof. B. Dattaguru


Biofuels – liquid and solid - Energy for future
Background and details
The World energy scenario today and in future
Principal issues and way forward on liquid biofuels, cooking energy, and distributed electricity generation
The final possible solution – biomass-hydro-wind-SPV combination
H. S. Mukunda
August 03, 2013, IISc-JU


The Combustion Institute
(Indian Section)
Prof. H.S. Mukunda
Hon. Advisor, ABETS, CGPL
Indian Institute of Science Bangalore
in
Recognition of delivering Dr V.K. Saraswat
Endowment Inaugural Lecture
24th April 2013
Bangalore
PK Pandey
Secretary
Dr V.K. Saraswat
Chairman

JAIN UNIVERSITY
Center for Disaster Mitigation

Prof. Paul Memorial
Combustion Science Workshop

22 & 23 February, 2014

LtoR:- 1)Siddiqui-,2)Varun-,3)-,4)-,5)Muruganandam,6)Rama,7)Sudarshan,8)Rajive,9)Nagendra,10)Chaitanya ,11)Anil,
12)Ram Gopal,13)Sriram

LtoR:-1)Nidhi Tiwari,2)Lovely Mallick,3)Vikram,4)R I Sijith,5)-,6)S Dasappa,7)Amith,8)B N Raghunandan,9)Vallabha Devi,
10)Joseph Mathew,11)-,12)Rakesh,13)Swetaprovo,14)S Varunkumar,15)Gnanendra,16)Mishra,17)M onica,18)Vineet,
19)-,20)Anand,21)Sreedhara S,22)Sai Ganesan,23)-,24)Debasis C,25)Balram,26)Shehesh,27)Arvind,28)Mrs.Paul,
29)Sachin,30)Sara,31)Istha Kumar,32)H S Mukunda,33)Sandeep,34)N K S Rajan,35)Sushil,36)Dixit


2nd PJP memorial workshop, by IIT Madras at Beach resort, 24-25 Feb 2015
NO SMOKING


THANK YOU

Visiting coal and biomass power stations in Germany during the course 2016, July 16 - Prof. Ajit Kolar above, Mrs. & Prof. hsm below

Screw conveyor for biomass

A large biomass power station
Visited on 2016, July 16


February 2016, VSSC, Trivandrum
3rd PJP memorial workshop


February 25, 2017, HEMRL, Pune


February 25, 2017, HEMRL, Pune
4th PJP memorial workshop
Prof HS Mukunda
Chief Guest


PROPULSION
Today
Symposium on 'Innovations and Advances in Chemical and Electric Propulsion Technologies' at LPSC, Bengaluru

Lectures on Biomass combustion/gasification at Kannur Engineering college, 19 – 20 Dec. 2018


Comparison of Conversion time with diameter
Reactants : (a) CO_2 (b) H_2O (c) air (d) O_2
CO_2
H_2O
air
O_2
10
d_p(mm)
$t_b \sim d_0^{1.03}$ CO_2 Kinetic and diffusion dependence
$t_b \sim d_0^{1.2-1.3}$ H_2O Kinetic and diffusion dependence
$d_0^{1.9}$ air diffusion limited
$t_b \sim d_0^{2}$ O_2 diffusion limited
Conversion time for char reaction with
1. CO_2 is 3-4 times that of H_2O
2. H_2O is comparable to air at d_p > 8 mm
Comment: There is so much of combustion physics in this, I wish char conversion is also taught in combustion courses; as far as I know only liquid drop combustion is taught.


1942 – 2017
75th year of celebration
PLATINUM JUBIL
CELEBRATION
December 14-15, 2017
भारतीय विज्ञान संस्थान
Department of Aerospace En
Indian Institute of Science - Be
M JUBILEE
RATIONS
14-15, 2017
Aerospace Engineering
te of Science - Bengaluru

Book Fills a Gap in Aeronautics Education

Experts endorse the book as a must have for studies in aeronautics

Understanding Air and Space Vehicles authored by Prof. H.S. Mukunda was released at the premises of the Indian Institute of Science (IISc.), Bangalore recently. Published by the Jain University Press, the book provides a distinctive view of comparative and contrasting features of all flying vehicles, within and outside the atmosphere, with examples drawn from recent developments on flight vehicles in India. It addresses all aspects of flying vehicles – aerodynamics, propulsion, structures, control, guidance and navigation, and their influence on

Birds vs. Aircraft or helicopter, Aircraft vs. Rocket based vehicles are examined for their commonalities and differences. The examples from contemporary developments with specially constructed tables and graphs used to illustrate the ideas and concepts provide the book with an added dimension. It can be read by all who have an interest in gaining an understanding of what, where and why of different types of aerospace vehicles.

The event was attended by a distinguished panel of scientists and educationists including Dr. V.K.


Prof. H.S. MUKUNDA
VASUDEV K. AATRE
Dr. CHENRAJ ROYCHAND
Prof. S. GOPALAKRISHNAN


Indian Institute of Science, Bengaluru
Prof. H.S. MUKUNDA
VASUDEV K. AATRE


BOOK RELEASE
UNDERSTANDING
AIR AND SPACE VEHICLES

THE TIMES OF INDIA, BENGALURU TUESDAY, NOVEMBER 21, 2017

TIMES CITY / STATE 5

Kitchens in Sidlaghatta switch to healthier option with Agni Sakhi

Fuel-Efficient Cookstoves Bring Relief

Arpita.Raj@timesgroup.com

Sidlaghatta (Chikkaballapura): Something new is cooking in the kitchens of Sidlaghatta, the heart of Karnataka's mulberry belt in Chikkaballapura, 70km from Bengaluru.

In a pilot, about 100 households have switched from traditional modes of cooking — using biomass and firewood in ill-ventilated kitchens — to a portable stove that requires less fuel that's easily available, and cooks faster.

Agni Sakhi cookstoves, brought to the rural households by the Bengaluru chapter of Technology Information Design Endeavour (TIDE), in association with Shell and Sustain Tech, Madurai, costs Rs 1,000.

Anything from agri-waste, twigs, cashew shells, coconut husks, corncobs and other items can serve as fuel for the forced draft stove which allows fuel and air control.

Agni Sakhi produces no smoke, barring the first few minutes, as its battery-operated fan works on a combination of gasification and combustion that uses the heat generated to burn the remaining fuel. The soot collects in a container, which can be removed and cleaned.

First developed in 2015 by former IISc professor H S Mukunda, the third version of the stove is being popularized now through public demonstrations, auto announcements as well as door-to-door campaigns.

While 200 stoves have been manufactured for sale, distribution happens through dealers in the villages.

Sharayu Kulkarni, project manager at TIDE, says that in most cases the buyer isn't the user. "Men seem to be more interested in this technology. During demonstrations, women are initially wary and talk among themselves without committing to purchase. The men, who usually pay for LPG cylinders and procure fuel, are interested in cost-effective options. At a one-time cost, these stoves are battery powered and have one hour backup," she said.

Introduced primarily for cooking, users have diversified Agni Sakhi's use. While some use it for heating bath water, sericulture farmers use it to heat rooms housing silkworms. Ashiq Ahamed, senior project manager, said while LPG is not a bad option, it doesn't provide energy security. "It's all about easy access in rural areas. People find it easier to go out of their homes and gather whatever they need to make fuel. Women say that along with delivery charges, a cylinder costs almost Rs 850 and takes five to six days to reach," he said.

KITCHEN OF JOY: Anything from agri-waste, twigs, cashew shells, coconut husks and corncobs can serve as fuel for the stove

Clean cooking mission next year

The government's Ujjwala scheme for LPG connections is aspirational. The stove, regulator pipe and cylinder are given free of cost. It found a lot of takers as LPG is being successfully used for a long time now. The ministry of new and renewable energy's focus on clean cook stoves wasn't effective due to various reasons. Also, while the stove would be subsidized, there was no policy on fuel. Natural draft cookstoves are not smoke free, but some other models are. Ultimately, users are concerned about cost of cooking. If you have to buy pellets (a type of fuel) for Rs 10-15 per kg, then LPG works out cheaper. That is why the government announced a draft national energy policy with a lot of focus on clean fuel. A national clean cooking mission has been scheduled for January 2018 that will analyze LPG penetration and a look at electricity-powered cook stoves among other things

Svati Bhogle | CHIEF EXECUTIVE AT TIDE AND MANAGING DIRECTOR OF SUSTAIN TECH INDIA

TIMES VIEW

The winds of change blowing in the kitchens of Sidlaghatta will bode well for the women of this rural belt, who have spent long hours in smoke chambers whipping up meals. Those who have used them are already finding merits in the smokeless Agni Sakhi cookstoves as compared to ordinary stoves and LPG connections. Banking on natural resources for fuel generation, the stove comes with a battery backup of up to an hour to ensure there's no disruption in cooking. The pilot project should be extended to more households after reviewing its impact. Any step that cuts down pollution in any form is welcome.

A stove that's made much difference

Shivamma, 37, cooks for seven people every day. Apart from working in the farm, she also has to take care of her house in Abalur, near Sidlaghatta. Having used a traditional stove all her life, she switched to Agni Sakhi three months ago. "My life has become much easier. Rice, sambar, ragi mudde, tea/coffee can be easily made on the stove and it's also faster. The flame burns bright and the stove heats up fast. Earlier, my vessels would turn black and smoke would fill the room. With this stove, there's no smoke," she said. Use of twigs also helps maintain food's flavour.

Shivamma's sister Dakshayini said different parts of the stove could be used for different purposes. "We use the perforated grate in the middle to make papadum and also dry coconut pieces," she added.

In another village, Belluti, 38-year-old Prema's household is a prime example of 'stove stocking'. She has an LPG connection, a traditional stove and Agni Sakhi. Prema uses them as per requirement. "When in a rush, I use the LPG. Since Agni Sakhi is portable, we take it out of the house when we cook non-veg. For other purposes, we use the old stove," she said, adding her LPG cylinder lasts 6 months despite being used for a family of 11. TNN

SCIENCE BEHIND THE SYSTEM

Fuel density has a big role to play in the efficiency of any cooking solution, says professor H S Mukunda. "Low-density fuel burns fast. In case of this stove, the fuel burns at a nominal rate, ensuring an optimal air-to-fuel ratio. With right air-to-fuel ratio, the fuel will burn fully. Smoke is merely unburnt fuel, so if it burns completely, only hot gas is produced," he explained. Mukunda said technology should suit the purpose of its use. The point was to combine fuel quality, supply chain management and combustion device to make sure combustion is low and efficiency high. "A cooking solution should also address user needs," he said.


cm
Camlin
Exam

Brief inaugural function of 6th PJP memorial workshop at FCRC, JU, Feb, 2019,
Director GTRE, Mr. Siddique in Chair

Boron Combustion Demo: Feb '19

2018, 5th PJP memorial workshop, DRDL, Hyderabad


26th National Conference on
Internal Combustion Engines and Combustion
NCICEC 2019
November 1-4 | 2019
DISTINGUISHED
SPEAKER
H. S. MUKUNDA
Indian Institute of Science (IISc) | Bangalore
India
EDU-TEK


MANAGEMENT DEVELOPMENT CENTRE

With participants of On-line course_IITM – 19 – 22 December 2019

At Wayanad conference - 2019