

A2D Journey : G.N. Tiwari



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Prof.G.N.Tiwari with research scholars at IIT Delhi

गुरु की महत्ता

Importance of Guru

स्वगृहे पूज्यते ज्येष्ठः, स्वग्रामे पूज्यते प्रभुः ।
स्वदेशे पूज्यते राजा, विद्वान् सर्वत्र पूज्यते ॥

The Eldery get worshipped in the family
The Chief gets worshipped in the village
The King is worshipped in his country
The Learned get worshipped every where.

अज्ञानतिमिरांधस्य ज्ञानांजनशलाकया ।
चक्षुरुन्मीलितं येन तस्मै श्रीगुरवे नमः ॥

I bow to my Guru who applied the ointment of knowledge to my eyes
Which were sightless because of the disease of ignorance
And thus restored vision to them.

गुरुर्ब्रह्मा, गुरुर्विष्णुर्गुरुर्देवो महेश्वरः ।
गुरुः साक्षात् परब्रह्म, तस्मै श्रीगुरवे नमः ॥

Guru is Brahma, Guru is Vishnu, Guru is God Shiva
Guru is supreme entity, I bow to that Guru
(Brahma, Vishnu, Mahesh is the trinity of God)

गुरु गोविंद दोऊ खड़े, काके लागूं पायं ।
बलिहारी गुरु आपने, गोविंद दियो मिलाय ॥

Guru and God are before me
To whom should I bow first
Who brought me to God
And therefore, I should bow first to the Guru.

"Guru Ji" Padamshri Prof. Mahendra Singh Sodha



Our Guru Ji is to us the best teacher on the earth
Our Guru Ji likes hard work, dignity and integrity
Social and academic causes are also dear to him.

Guru ji also belongs to village folks and gets respect from the
opponents Pray almighty "Mata Kali Ji" for his long long-life with
good health Desire to celebrate his birthday for many years.

He has inspired us to serve the nation, in general, and parent institute, in
particular Desire to learn more from his vision in teaching, research and
human qualities Promise to Guru Ji to follow the path shown by him.

Gopal Nath Tiwari

Preface

We are honored and privileged to present this write-up about Prof. G.N.Tiwari (Param puja Guru ji) about his journey from Adarsh Nagar, Sagerpali, Ballia (UP) to **Delhi (A2D)**. Few months back, we have approached Prof. G.N.Tiwari, our mentor, to write about his experience at IIT Delhi and he has agreed for the same. We are also thankful to him for his gesture to our request. Further, we have requested Mr. Shyam and Mr. Love deep, research scholar, Centre for Energy studies, IIT Delhi to get feedback from Prof. Tiwari's friend /Ph.D. students to express their view about Prof. G.N. Tiwari.

We are grateful to all his Ph.D. students who have agreed to participate this thanks giving ceremony to Guru ji Padamashree Prof. M.S. Sodha, FNA.

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Brief Profile of Prof. G.N.Tiwari



Professor Gopal Nath Tiwari, born on July 01, 1951 in Ballia (UP), India, received doctoral degrees in 1976 from Banaras Hindu University (B.H.U). Since then, he is working at Centre for Energy Studies, IIT Delhi. To his credit, he has published about 600 research papers, 25 books and supervised more than 80 Ph.D. students in renewable energy sources. His research papers have been cited by about more than 11,000 researchers with h-index of 50. He has been awarded for best papers, Indian building Congress and book by Indian Society of Agricultural Engineer.

He is a co-recipient of the “Hari Om Ashram Prerit S.S.Bhatnagar” Award in 1982. He has visited many countries like USA, UK, France, Sweden, Italy, Taiwan, etc. as an invited speaker, organizer, expert for short/long term. He was a recipient of a European Fellowship in 1997 and had earlier visited the University of Ulster (UK) in 1993. In addition, he had been nominated for an IDEA award in the past. He is responsible for the development of “Solar Energy Park” at IIT Delhi. He has successfully co-ordinated various research projects on solar distillation, water heating systems, Greenhouse technology, hybrid photovoltaic thermal (HPVT) systems, etc. funded by the Government of India in recent past.

He is holding the position of Editor-in-chief, Editor, Associate Editor and reviewer in many international journals till date. Professor Tiwari has been conferred “Vigyan Ratna” by the government of U.P, India on March 26, 2008 and Valued Associate Editor award by the J. of Solar Energy. He has also organised two international conferences at IIT Delhi, New Delhi, and BHU, Varanasi, India in 2007 and 2012 respectively. He is also a founder President of the Bag Energy Research Society (BERS: www.bers.in), which is a pioneer in energy education in rural India.

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1.

My Village

1.1 My Ballia-Banaras (B-B) connection

I am the second son of Mrs. Bhagirathi Tiwari and Pandit Bashisht Tiwari (Photo 1.1) and I was born at Adarsh Nagar, Sagerpali, Distrcit Ballia (UP). My elder cousin brother, late Shri Gauri Shanker Tiwari got me admitted in class first on July 01, 1957 and hence my birth day became July 01, 1951. This date is common to many of my peers because our schools used to start with effect from July 01. My grandparents (Photo 1.2) moved to Adarsh Nagar from Mauza, Basthana -Khutaha due to the heavy floods at the border of UP and Bihar in 1947.



Photo 1.1: Parents of Prof. G.N. Tiwari



Photo 1.2: Grandmother of Prof. G.N. Tiwari

My family members including myself are devotees of **OM MATA KALI** (Photo 1.3)



Photo 1.3: Mata kali Ji, Adarsh Nager, Sagerpalli, Ballia (U.P.)

Income of my grand-parents was based on an agricultural land which was disturbed due to heavy flood and hence being a Brahmin family, they shifted to Varanasi to earn livelihood. I took my primary education from grade 1 to 8th at my village. The death of my grand-father (late Mr. Ramdhari Tiwari) in 1959 due to poor income in my family and separation of my uncle from our family shocked me due to his involvement in my primary education when I was in grade 3rd. I learned cycling and swimming in local river near my village. Till then, I faced death twice during swimming and illness. During my primary education, my understanding of mathematics including Tables was much better than that of other colleagues. I want to share one event with all. Before the final examination of 8th, a farewell was organized for all of us with puja of "Satyanarayan Bhagwan Katha". During the puja, one of our friends (Mr. Tarkeshwar Tiwari) was mischievous and our teacher Mr. Bir Bahadur Singh noticed the mischief and asked as to who did the mischief. No one answered his question; then he said that who so ever did it, will not pass in the examination and this came out to be true. Till date his life is miserable. I also passed 8th class with poor marks (IIIrd division) and Mr. Komal Nath Dushadh , supposed to be brilliant student at that time, suggested that I should say that I have passed with first division with two body guards. That remarks changed my destiny and I then decided to move to Banaras (old name of Varanasi) for higher schooling. The name of Banaras was changed to Varanasi by then Chief Minister Late Sampurnanand ji due



Photo 1.4: 1966, High school

to location of Banaras between Varuna River and Assi Ghat. I got admitted to 9th class in Adarsh Inter College, Kabir Chaura near DAV College. Founder of Adarsh Inter College was Shri Kamalakar Choubey from Ballia and after his death, the college was named after him. I was able to remove first body guard in 10th class as I cleared High School in IInd class due to hard work in 1966 (Photo 1.4).

Further, I got much help in mathematics particularly trigonometry, statics and dynamics from the father of Mr. Nand Kishor Rai, my classmate belonging to Ujiarghat, Ballia. After passing 11th class in 1967, my father, Pandit Bashisht Tiwari, forced me to marry Mrs. Kamalawati Tiwari (Photo 1.5) on July 10, 1967.



Photo 1.5: Mrs. Kamalawati Tiwari

Even after marriage, I was again able to remove second body guard and passed 12th class in first division with distinction in Math and Physics, my favourite subjects, in the year 1968. English was optional due to Shri's Charan Singh government in UP.

Up to 12th class, my mother used to support my education with money she had saved. This had happened due to the blessing of my parents and Mata Kali ji. Since then I believe that

"For self-growth, one has to respect his/her parents and all elders"

If anyone does not respect parents/teachers, he/she can't do justice to any one in his/her life.

After 12th class, I got admitted in second year of B.Sc. in Banaras Hindu University (BHU) with Physics, Math and Statistics (PMS) in 1968 (Photo 1.6) and cleared B.Sc in 1970 with 74.75% aggregate marks (60% Physics).



Photo 1.6: 1968, Intermediate

After B.Sc., I got a job in my parental high school with the help of my father but I refused the job and got admitted to M.Sc. in Physics with specialization in Electronics. It was only possible due to the help rendered to me by Prof. Anand ji, Dean, Law faculty, BHU through Prof. G.S. Verma, Head, Physics Department. Prof. Anand ji was the son of Shri Musayanti Prasad, a famous lawyer of Kali Mahal, Varanasi, who was a close associate of my father. Due to Statistics subject in B.Sc., I got an appointment with direct interview through employment exchange office registered in BHU campus, as a Statistical Officer Grade-I in UP government in June 1971. At that time I had cleared the first year of M.Sc. and my father with consultation with his friends did not allow me to join the job but allowed me to complete M.Sc. in 1972 (Photo 1.7).

Prof. B.A.P. Tantry was Head, Physics Department, during my final semester of M.Sc. My special paper of Electronics was the last paper with two days break. But I got typhoid fever and I was not in a position to take the examination. However, I went to the examination and Prof. P.C. Banerjee was the invigilator at that time. In the examination, I was not able to write the paper due to illness. Prof. Banerjee observed that I was not able to write the paper. He suggested to me to see Prof. Tantry ji to inform him of my position and I went to his house straight way and told him about my illness. He asked some questions based on my paper and I was able to answer more than fifty percent of the questions. He assured me of passing that paper and finally he did it otherwise I might have lost one year which I was not able to afford due to my family conditions. My first son was born in January, 1971 before M.Sc. So I decided to join to teach in a college without any success. When I used to go for interview for any college, my mother with help of my wife used to light the lamp in front of Maa Kali ji for my success. There was three special interviews about which I definitely want to mention here:



Photo 1.7: 1972, M.Sc.

- (i) First: I went for an interview for lecturer at Raj College, Jaunpur (UP). For this interview, I had approached the manager of Raj College who happened to be former ruler through late Shri Gopal Sabu, former President of Jansangh, Banaras. Shri Gopal Sabu was best known to my father. I was not successful in the interview, even my best one. Prof. S.N. Pandey of Gorakhpur University, was an expert for physics post. I can remember his first question on physics to define law of deflection and I explained this to him correctly with diagram but he told me that I was not correct. Further he humiliated me by suggesting that I cannot answer his question and therefore not teach graduate students". Finally I was not selected.
- (ii) By chance, I again faced Prof. S.N. Pandey in another interview at Degree College, Bhatpar Rani, Deoria (UP) and challenged his credibility for the interview. He finally realized his mistake of humiliating me earlier. Finally, the interview was cancelled.
- (iii) I also went to interview for lecturer in Rajghat Anee Basant School and for that I approached Prof. P.Krishna of Physics Department, BHU through Prof. Anand ji, Dean Law faculty, BHU without any success.

After these three interview, I concluded that it is very difficult to get a job without a powerful backing. I needed a job for survival of my married life and parents because there was no family member who was earning.

2.
My
Higher Education

2.1 Preamble

From Sept. 14, 1963 - June 30, 1972 (Mr. R.N. Dogra, Director, IIT, Delhi)

Prof. M.S. Sodha, while in USA, had got offers from two organizations in 1963. He decided to join Indian Institute of Technology Delhi (IITD) in the year 1964 as a Professor in the Department of Physics after leaving a good job in United State of America (USA). Shree R.N.Dogra was founder Director of IIT Delhi. In the beginning, there was no culture to publish research papers in the institute. He faced a lot of problems in publishing his first paper. Also, the Director had constituted a committee under chairmanship of Prof Ajit Kumar Verma, Director, National Physical laboratory (NPL), New Delhi to confirm him after getting a tip that Prof. Sodha was planning to leave IIT Delhi. Finally Prof. Sodha was confirmed after two years. Prof. Sodha had supervised his first Ph.D. student in IIT Delhi, Prof. P.K. Kaw ; Shree Dogra attended his Ph.D. viva personally.

2.2 Brief Introduction (BHU)

After M.Sc. (Electronics) in Physics, I tried very hard to get a job without any success and after a year, I joined for Ph.D. with Prof. B.A.P. Tantry ji in July 1973 again with the help of Prof. Anand ji. Suddenly after six months, Prof. Tantry ji passed away due to prolonged illness. At the time of his death, Prof. Tantry ji was supervising many students and also correcting the thesis of Prof. Jagdish Rai. I and Prof. Jagdish Rai (both Ph.D. students of Prof. Tantry) were transferred for Ph.D. to Dr. S.K. Tolpadi. Dr. Tolpadi had never supervised Ph.D. students till that time. Prof. Jagdish Rai became his first student and hence it took long time for him to correct his thesis. Drs. Dinesh Singh, Shyam Narayan Singh and P.N. Gupta were also Ph.D. students of Dr. S.K. Tolpadi. I became his last student. As a tradition, I was associated with Dinesh Singh by Dr. Tolpadi. I was not aware of Ph.D. work. I was asked to complete the numerical computation of some published work of Dr. Dinesh Singh and I did it honestly and learned a lot about Ph.D. and came to conclusion about sensitive and non-sensitive parameters of any research problem. I too helped Dr. S.N. Singh and Dr. P.N. Gupta. But I could not get help from even one colleague except Dr. Dinesh Singh and Sr. S.N. Singh. Till then my fellowship was near to an end. Then I did calculations for four research papers in consultation with Dr. Tolpadi and communicated them to Indian Journal of Radio and Space Physics; all the four papers were accepted and published in the same issue. With publication of four research papers, I got CSIR junior/senior research fellowship. Since I had joined first as JRF it was to be converted into SRF after submitting my thesis. I completed my Ph.D. in Plasma Physics from Department of Physics, Banaras Hindu University in 1976 (Photo 2.1) under supervision of Dr. S.K. Tolpadi. I was the first student of 1972 batch to submit my Ph.D. thesis.

During my PhD work, my second son (Arvind Tiwari) and my first daughter (Miss Anjana Tiwari) were born in 1974 and 1976 respectively. After award of my Ph.D. degree, my SRF got automatically converted into PDF. All the four students of Dr. S.K. Tolpadi namely Prof. Jagdish Rai, Prof. Dinesh Singh, Prof. S.N. Singh and myself had dedicated our thesis to late Prof. B.A.P. Tantry ji. I had published about eighteen research publications including my independent research publication in IEEE Plasma Science. After completing my Ph.D., I was offered a post of senior scientific Assistant (SSA, in Class II scale, Government of India) in CEERI Pilani, Rajasthan. I went Pilani to join CEERI in the month of April, 1977. Before joining, one Ph.D. student (Dr. Raghuvir Singh) of Late Prof. B.A.P. Tantry ji called me and advised against my joining due to indifferent attitude of senior scientists towards SSA in CEERI. After his advice I requested for an extension of joining SSA for a month. He also advised me to get the transfer of my PDF from BHU to other institutions like IITs. I was not knowing anybody in IITs except Prof. M.S. Sodha who happened to deliver invited lectures in BHU. After taking extension of my joining in CEERI Pilani, I met

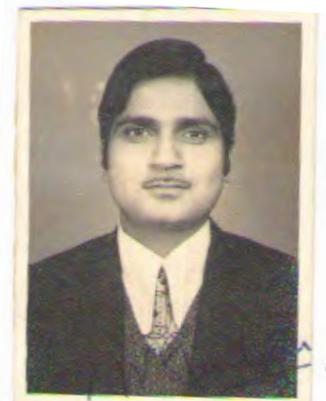


Photo 2.1: 1976 PhD

Prof. M.S. Sodha at his residence in IIT campus in the morning of Sunday in first week of June. I was completely surprised the way Prof. Sodha treated me at his residence. After meeting with him I decided to join as PDF and I was sure that he will help me in getting a job somewhere. In the meantime, I went back to BHU for no objection certificate from my supervisor to transfer my PDF. When I informed about the transfer of PDF to my supervisor and Prof. G.S. Verma, Prof. Verma told me that you now can get job in IIT Delhi. I said how, then Prof. Verma said that Prof. Sodha is a person who can fight for a job for his students provided they work hard.

2.3 My IIT Delhi Journey: A down fall of education

From July 1973- June 30, 1978 (Prof. N.M. Swami)

Finally, I joined the School of Energy, Indian Institute of Technology Delhi in the month of June, 1977 with Prof. M.S. Sodha as a Council of Scientific and Industrial Research (CSIR), Post-Doctoral Fellow (PDF). During this period, IIT Delhi ranked high at international level. Since Prof. Sodha was a well-known personality in Plasma Science. I desired to continue my research in Plasma science. At that time, he suggested that there is lot of scope in solar energy in our country and it is easy to get job if you work hard. I decided to work in the area of solar energy. The School of Energy was then established with the leadership of Prof. M.S. Sodha to carryout research in renewable energy sources to meet the challenge of the oil crises in the beginning of 1970. After joining as PDF, I decided that Prof. Sodha will be my mentor as well as Guru Ji for my whole life. One day Prof. Mathur asked me to work with him for better future which I declined by mentioning that I will work only with Prof. Sodha otherwise I will leave IIT Delhi. For this statement, I paid a lot.

After few months of my joining as PDF, I lost my youngest daughter (Miss Anjana Tiwari) in my village in the month of July 1977 and I could not go there due to financial crunch. After some time, Guru Ji helped me financially by Rs. 2000/- to meet my family requirements.



Photo 2.2: Initial days of experimentation at IIT Delhi

Along with me, J.K. Nayak from Orissa and Alok Srivastava from Varanasi had joined for their Ph.D. program. We all are working together with experiments on solar distillation and ground collector (Photo 2.2).

Since there were no data loggers with us so we had to take observations with a 24 hour cycle with micro-volt meter manually. I and Alok Srivastava made experimental observations in the night and we were not able to meet Guru Ji during day time.

Hence Dr. S.C.Kaushik, who was lecturer already, always took all the credits for the experimental observations and guru ji was not happy with us particularly with me. In one of the nights, I and Alok Srivastava were taking observations in the midnight with the help of a torch and Guru Ji was returning from a party, our experimental set-up was on the way. He thought that someone are damaging experimental set-up and he came to us and saw that we are taking observations; he then thought that the impression given about us was wrong. After sometime he told Dr. Kaushik to disassociate with me and Alok Srivastava.

There were some faculty selections in the area of solar energy in 1978 and I was appointed a Research Associate with effect from July 03, 1978 (Ref.: IITD/Estt.-I/ Appts/RA/B-967 dated: July 03, 1978) during tenure of late Prof. N.M. Swani, then Director of IIT Delhi (till 1978). In that selection, Dr. C.L. Gupta was not in my favor for lecturer and only guru ji supported my candidature for at least RA due to my married life with two children. All faculty and students were working day/night to meet the objectives of School of Energy.

From July 01, 1978 - June 30, 1983 (Prof. O.P Jain, Director)

After joining as Director, Prof. O.P. Jain, appointed Prof. M.S. Sodha as Deputy Director. Due to hard work by the group and the requirement of man power, Professor Sodha as Head got appointed many scientists and engineers through proper selection committee including myself (Ref.: IITD/E-I/41/78/2508/2527 dated: September 26, 1979) and Dr. N.K. Bansal(Stefan College, DU) as lecturers and Dr. N.D. Kaushik as an Assistant Professor (Ramjas College, DU) in School of Energy in the year 1979 when late Prof. O.P. Jain was Director of institute (1980-1984). In this selection, Dr. R.C. Tyagi, who was on deputation from SSPL, New Delhi, was not selected as a Professor due to opposition from Dr. Shankar Lal, Director, IIT Kharagpur. Dr. Shankar Lal and Dr. O.P. Jain both were from then Roorkee University (UP). Here, I want to mention one very important point that in the interest of country in general and institute in particular, Professor Sodha had taken keen interest and worked hard day and night to train the younger and newly appointed senior faculties who had a background of physics, in the area of solar thermal. He had also arranged to train the younger faculty for upgradation of their English skill (technical papers) and spoken capacity by Shri Suresh Upadhyaji of Humanities Department. This was the approach of Professor Sodha as a teacher and researcher to serve the country unlike others. In the year 1979, Prof. Sodha and myself were rated first and second workers, productive of scientific research papers in India (Indian Energy Abstract: Vol. 8(1), Jan.-March, pp 11, 1989). By keeping my lien on lecturer position, I joined as SSO-I in project under Prof. Sodha (Ref.: IITD/ICL/PF/383/5950 dated: March 03, 1981). Later on, School of Energy became a full fledged Centre known as Centre for Energy Studies (CES) and M.Tech. Program was started in energy. In the meantime, Prof. S.S. Mathur became the head, Centre for Energy Studies (CES). During the tenure of Prof. Mathur as a Head, there were appointments of lecturers and Assistant Professors in CES. In panel of lecturers and Assistant Professors, the name of Dr. T.C. Kandpal, one of students of Prof. S.S. Mathur and my name, last in panel was listed. Now, Prof. Mathur played a very negative role to appoint Dr. T.C. Kandpal as a lecturer against my permanent position of lecturer to harass me during my appointment as a Assistant Professor in the year 1981. I was on lien from the lecturer in project as a SSO-I (Ref.:IITD/Esst.-I/524 dated: February 17, 1981). Further, Prof. Mathur had also left out Dr. Nayak who later joined IIT Bombay as a lecturer. All names in the panel of Assistant Professors was cleared by Prof. Mathur except my name. This was the worst period in my life due to Prof. S.S. Mathur. Later on, many months passed and I was not able to get my appointment letter for AP with assurance even by Director. Then, I resigned from SSO-I to become lecturer, then I found that there was no position of lecturer because Dr. Kandpal was already offered my position of

lecturer. In that situation, I was temporarily placed on a lecturer's position (Ref.: IITD/E-I/4615 dated: October, 28, 1981 and after two days, I was offered the post of Assistant Professor against the sanctioned post of Professor in the same year in the institute (Ref.: IITD:E-I/4646 dated October, 31, 1981)).

This was a news in IITD to become AP from lecturer in shortest time. Prof. M.S. Sodha had played an important role to get my appointment released. I was confirmed after four years as Assistant Professor in CES (Photo 2.3) during the tenure of Prof. K.L. Chopra as Head, CES, in spite of opposition made by Prof. S.S. Mathur former Head, CES (Ref.: IITD/E-I/2433 dated: February 12, 1985) against the sanctioned post of Professor in CES. Later on, Prof. K.L. Chopra, a physicist became the Director of IIT Kharagpur where he served for two terms as a Director.



In the month of June, 1985, I went to Italy (Photo 2.4) to attend a short term course on photovoltaics for one month with a bond of Rs.20,000/- (twenty thousand only)



Photo 2.4: 1985, Italy visit

with ministry of human resource and development (MHRD) through IIT Delhi. According to the bond, I had to serve the institute for a period of two years (July, 1985 to June, 1987). During the short term course, I also attended an international conference in Montreal, Canada on solar energy.

From July 01, 1983-1989 (Prof. N.M. Swani)

Prof. N.M. Swani was appointed second time as Director of institute due to close relations with founder Director Shri R.N. Dogra in the year 1984 during congress rule in the country. Prof. M.S. Sodha who had several hundred research publications and few books along with having a prestigious

national S.S. Bhatnager award was denied consideration due to his basic science background as it was informed to him unofficially and he went on foreign assignment by the World Bank. It is also important to mention here that to the best of my knowledge Shri R.N. Dogra as a Director was in the beginning against Prof. M.S. Sodha. To his credit Prof. Swani had a only very few research publications. In the second tenure of Prof. Swani as a director, the following two main events took place:

(i) A committee was constituted under the chairmanship of Prof. M.G.K. Menon to review/asses the research work done by the faculty in the past five years. All efforts made by Prof. Sodha in developing the human resource through M.Tech, Ph.D., literature in the form of books, research papers, industrial interaction, organizing conferences and short terms courses etc. was criticized by Menon committee even though we got a many research papers, books and Hari OM Ashram Prerit S.S. Bhatnager award. It was purposely done by Menon committee just to defame us. Ultimately, they were successful and Prof. Sodha could not become the Director of IIT Delhi. In the absence of Prof. Sodha, there was a lot of frustration in his group. However, his group continued their research in his absence which was recognized at National and international level. At present, M.Tech. and Ph.D. alumni from the Centre for Energy are occupying senior academic and administrative positions at national and international level and playing important role in policy decisions for implementing the solar energy program. This has happened due to the pioneering effort made by us.

And

(ii) I was elected the President of faculty forum (FF), IIT Delhi to pursue the cause of faculty at institute as well as at ministry level. I later became general secretary of ALL IITs Teacher federation. I served as President, FF, IIT Delhi and general secretary for a period of two years. During my tenure, the faculty forum

was recognized by IIT Delhi and the 4th pay commission recommended pay structure as per our reasonable demands was implemented.

During the second tenure of Prof. Swani, all the faculty in CES including myself associated with Prof. Sodha never got promotion. Also I was treated anti-establishment due to my affiliation with faculty forum. I got an offer of senior lecturer-ship at University of Papua New Guinea, Papua New Guinea (PNG) in the year 1987. It was due to the kind help given by Prof. D.K. Roy of Physics, IIT Delhi. Till then I had already served IIT Delhi about one year and seven month after successful completion of short term course in Italy from July 1985. In addition to the length of my service (one year and seven month), I was entitled to Ex-India leave of one year and nine month based on my service to IITD. Even then administration of IIT Delhi forced me to deposit the money of bond (Rs. 20, 000/-, twenty thousand) to ministry (Ref.: IITD/Esst.-I/48/78/B/7595 dated:Jan. 29,1987). I did the same (No.F.14-44/85-E.S.5 dated: Feb. 20, 1987) to MHRD and joined UPNG in the month of April, 1987 with my family (Photo 2.5). My third son (Ghansyam Nath Tiwari) was born on July 29, 1987 in Papua New Guinea (PNG).

Due to education of my children (Bal Govind and Arvind) in India, I came back to IIT Delhi with my family on leave in the month of June, 1988. After my return to University of Papua New Guinea (UPNG) on September 01, 1988, there was theft in my apartment and I lost all personal belongings including my passport. I reported the matter to local police and file FIR. After my FIR, Royal Papua New Guinea Constabulary issued a letter to me that they have not recovered my passport on November 15, 1988 (CRIME REPORT No.:3223 Dated: September 01, 1988). Indian embassy at Fiji was the appropriate authority to issue a transit passport, to return after completion of my Ex-India leave in the month of November, 1988. However, there was coup in Fiji and I was unable to contact the embassy. I reported my situation to IIT Delhi and requested that my leave should be extended till I get a transit passport. Instead of considering my extension of Ex-India leave, IIT Delhi issued show cause notice about termination of my service as per bond signed with IIT Delhi through fax dated: January 11, 1989). Ultimately, the administration of IIT Delhi sent to me a fax that I had been terminated from service as per bond signed with IIT Delhi.



Photo 2.5: 1987, UPNG

My wife approached the administration to explain my situation because she was in PNG with me till June 1988 but she got sarcastic answers about me and ultimately she moved the Delhi high court on my behalf for justice and I did get justice. Administration of IIT Delhi had to extend my Ex-India leave till I got the passport (No.: IITD/ Esst.-I/B/85 dated: January 25, 1989). This is indicative of the attitude of the administration of IIT Delhi towards me during Prof. Sawni's tenure as a Director of IIT Delhi.

In the year 1988, Prof. M.S. Sodha was offered the post of Vice-chancellor of Devi Ahilya Viswavidyalay (DAVV), Indore and he joined the university. During his tenure, the university had grown to very high level. Due to this fact, DAVV was recognized nationally and internationally.

This was the start of decline and down fall in science and engineering education due to arbitrary promotions and appointments made at all levels including Directors, Chairman board of governors, etc. in all IIT's by the government of India , due to the clout of a few.

It was due to political interference of Government machinery in appointments of Directors and Vice-chancellors in central funded academic organizations through a scientific group at national level led by Prof. M.G.K. Menon, Prof. Yash Pal, Prof. C.N.R. Rao, Prof. R. A. Mashelkar, Dr. Anil Kakodkar etc...

From Feb. 07, 1989-June 30, 1994 (Prof. N.C. Nigam)

After the end of Prof. Swani's second tenure, Prof. N.C. Nigam was appointed as a Director of IIT Delhi. Another point, I just want to mention that after 4th pay commission's recommendation which were to be implemented with effect from January, 1986, late Prof. N.C. Nigam was the Director of the Institute. Because of my association with Prof. M.S. Sodha in CES and faculty forum, I was not given my due as per 4th pay commission recommendations despite good number of Ph.D.s supervised and research publications in comparison to others. For irregularities at IIT Delhi, I met Late Shri Chandrasekhar ji, then Honorable Prime Minister of India (Photo 2.6) with the help of his very close associate late Shri Parmanand Tiwari who happened to be my eldest brother in law. Shri Chandrasekhar ji was also Member of Parliament (MP) from my home town Ballia. Finally, there was no fruitful result and I decided to work harder which paid me finally in 1997.

I was humiliated for a long time till 1997 due to two reasons viz. my association with Prof. Sodha and secondly becoming President of a Faculty Forum (FF) second time in early 90's during Prof. Nigam's tenure. Further, there was a strong protest by Ph.D. students at the institute level for a long period and the FF supported the cause of Ph.D. students regarding enhancement of fellowship. Here it is important to mention that our academic credentials in terms of research publications and supervision of M.Tech. and Ph.D. students was much better than anyone promoted from Assistant Professor to Professor by Prof. Nigam.

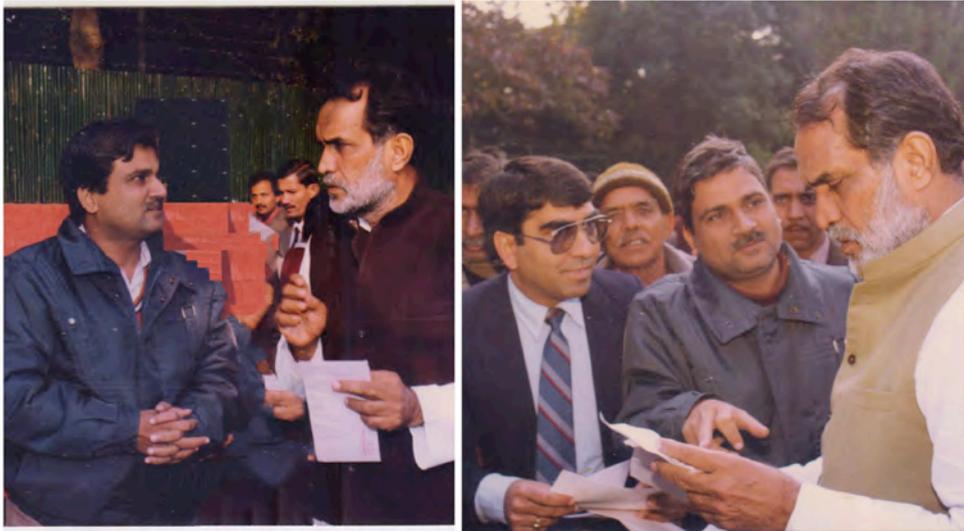


Photo 2.6: With then Hon'ble Prime Minister of India, Late Shri Chandrasekhar ji

In the meantime, I got an offer of European Fellow from Department of Science and Technology (DST) based on my academic credentials (publication and Ph.D. Supervision) to work with world renowned scientist Prof. Brian Norton, University of Ulster (UK) in the months of January, 1993 for a period of six months. I went to work with Prof. Norton (Photo 2.7). I returned after completing the European Fellowship and rejoined IIT in July, 1993. I was blessed with a beautiful daughter (Gopika Nandani Tiwari) on March 24, 1994.



Photo 2.7: 1993, With Prof. Brian Norton

Due to his mismanagement at IIT Delhi, Prof. Nigam did not get an extension. Prof. Nigam was the most controversial Director. During his tenure, research work had taken a back seat in promotions which were apparently randomly made.

From Jan. 09, 1995- June 30, 2000 (Prof. V.S. Raju)

After the end of the tenure of Prof. Nigam, Prof. V.S. Raju from IIT Madras joined as Director, IIT Delhi in the year 1995. Prof. Raju also started the process of promotion of faculty at each level. Again, I was left out inspite of having 200 research publications and supervision of 20 Ph.D. students to my credit. This happened because of Prof. S. P. Sukhatme of IIT Bombay, a close associate of Prof. M.G.K. Menon and his group, as an expert in the area of solar energy. Here, I desire to mention that Prof. Sukhatme was a Ph.D. examiner of one of my Ph.D. students, Mrs. N.K. Dhiman. He had made un-necessary comments on her Ph.D. thesis to reject it. He did not conduct the viva to avoid his humiliation with satisfactory reply from the student. Since then he has been against me.

After my rejection for the post of Professor, I met Prof. Raju and explained to him the situtaion. He assured me that the mistake will be rectified in the next selection. I became Professor in the year 1997 (Ref.: IITD/E-I/U-3/3445 dated August 13, 1997) after a gap of about 12 years. For this I thanked Prof. Raju personally. During these 12 years I was humiliated despite having large number of research publications and Ph. D. supervision.

In the meantime, my name was proposed by Prof. M.S. Sodha for Shanti Swarup Bhatnager (S.S. Bhatnager) award in the year 1995 in the area of Engineering Science. However, the results were announced in the year 1996. It is important to point out that no nomination got the S.S. Bhatanger award in the area of Engineering Science for 1995. It was pointed out by some members when contacted that I did not have enough number of supporters. Further, there was no interest of members in other candidates. I learnt that an award is a number game little based on research work.

I was also nominated for the Swedish International Development Energy Agency (IDEA) award by an international jury to design an improved solar still to get potable water (New Scientists, Np.:1856, January 16, 1993) from brackish/saline water.

It is notable that today's green campus of IITD is only due to Prof. V.S. Raju.

From Dec. 13, 2000-April 06, 2005 (Prof. R.S. Sirohi)

Professor R.S. Sirohi, a physicist and 33th Ph.D. student of Prof. M.S. Sodha become Director, IIT Delhi during National Democratic Alliance (NDA) government during 1998-2004 and joined in the month of December, 2000. He came from IIT Madras. He was also one of best friends of Prof. B.N. Gupta, Director, NSIT, New Delhi. Later on, Prof. Sirohi also became the Chairman, Board of Governor of NSIT. I knew Prof. Gupta as my neighbour in the IIT campus and supervised his daughter for Ph.D. degree in the area of solar distillation. Being a Ph.D. student of Prof. Sodha and best friend of Prof. Gupta, I had a good relation with Prof. Sirohi. Under his chairmanship, we also celebrated 70th birthday of Prof. M.S. Sodha known to us as Guru Ji on February, 08, 2002 by having a two day national conference on the areas of:

(i) Solar Energy

and

(ii) Plasma Physics

We also published proceeding of the conference. Prof. Ajit Kumar Verma was the Chief Guest.

After the conference in 2002, Prof. Sirohi asked me to do the some demonstration project in IIT campus and start some program related to renewable energy sources. In this direction I proposed the following:

(i) To have solar lighting system along the main road from IITD main gate to hostel area and

(ii) To start M.Tech. in applications of renewable energy in agriculture engineering.

We finalized both projects with the faculty board and Professorial committee's approval. In this regard, Dr. N.S.L. Srivastava, DDG, Indian Council of Agriculture Engineering (ICAR), New Delhi had agreed to come as a visiting Professor after his retirement and his name was cleared at every stage and only director's approval was needed. Finally, Prof. Sirohi rejected both projects in the presence of Prof. S.K. Dube, then Director of IIT Kharagpur, for reasons best known to him.

Further, three events occurred which are as follows:

(i) Dr. Shruti Agrawal, daughter of Dr. B.N. Gupta, had applied for AP in CES in solar thermal energy. Prof. Sirohi advised Prof. Avinash Chandra (Head, CES), not to short list her and finally she was not selected. Now, she is Professor in GNDIP University. Also Prof. Sirohi informed Dr. B.N. Gupta, a close associate, that myself and Head, CES were responsible for not short-listing Dr. Shruti Agrawal.

(ii) Prof. Sirohi had applied for INSA Fellowship and Prof. K.L. Chopra was a member of jury to recommend the names of INSA Fellows. Finally, he did not get INSA fellowship and became angry with Prof. Chopra. He requested Head, CES to terminate his visiting Professorship in CES but Head, CES did not oblige Prof. Sirohi but he was not given extension after two years. This was a unique case for not extending the tenure of any Head after two years. Here, I want to mention that I had proposed the name of Prof. K.L. Chopra for visiting Professor in CES, other Professors in Professorial committee had agreed and it was also approved by Prof. Sirohi as a Director.

(iii) A point which I want to share is that Prof. M.G.K. Menon was the chairman, Board of Governors, IIT Delhi for a period of three years and I met him regarding irregularities in appointment of Emeritus Professor of Renewable Energy in CES at IIT Delhi during his term and tried to convince him about one hour without any results. It may be due to his support of Director, IIT Delhi.

(iv) There was a Ph.D. student namely Mr. Shailendra Kumar Shukla (1998IRD004) registered with me and Dr. I.P. Singh of IDDC during the tenure of Prof. Chandrasekhar as Chairman, IDDC. During his Ph.D. work, I came to know that Mr. S.K. Shukla is cooking the data of all my experimental set-up in solar energy park and sending the same to journals for publication. I reported the matter to Chairman, IDDC and the withdrawal of my supervision of Mr. Shukla was approved by the office of Dean (Ref.:IITD/A&E (PGS&R)A-2/2004/9246 dated July 01, 2004). A committee consisting of Prof. S.C. Kaushik, CES; Dr. (Mrs) K. Gadgil, CES and Dr. V.P.S. Sorayan, C.R.D.T. was constituted to oversee the guidance of Mr. Shukla. Just after 14 months, I came to know that there is Ph.D. viva of Mr. Shukla on September 09, 2005 at 11:30 am through a notice issued by D.T. Shahani. On September 08, 2005. I wrote a letter to the Director with copy to Dean. PGS&R, Chairman, CEC, IDDC about fraud in his thesis. The committee ignored my note and he finally got the Ph.D. degree. Dr. S.K. Shukla is presently Associate Professor in IIT BHU. The Ph.D. degree of Mr. Shukla was awarded on fraud research work at IIT Delhi during the tenure of Prof. Chandrasekhar as a head or a CRC chairman in IDDC, who happened to be a student of Prof. R.S.Sirohi.

Professor Sirohi also asked me to take the charge of Hindi cell which I declined due to my differences with him about his refusal of appointing Dr. N.S.L. Srivastava as a visiting Professor after approval from Professorial committee of CES and at various levels.

Prof. D.P. Kothari and Prof. Surendra Prasad were two Deputy Directors (DD's) during the tenure of Prof. Sirohi and Prof. Sirohi was asked to hand over charge to Prof. D.P. Kothari senior DD after completing his term and not getting an extension.

From Oct. 11, 2005- Sept. 27, 2011 (Prof. Surendra Prasad)

Professor Surendra Prasad, a close associate and one of Ph.D. students of Prof. P.V. Indresan, former Director, IIT Madras got the offer of Director, IIT Delhi. To the best of my knowledge, his term was also full of controversies with UG/PG students and faculty affairs. He also had a biased attitude towards a section of faculty members including my-self being an internal candidate. For example, an amount of Rs.60 lakhs (sixty lakhs only) was sanctioned to me to purchase a solar indoor simulator for testing of PV modules but I could not purchase it due to delaying tactics.

Prof. Surendra Prasad had an indifferent attitude towards the academic activities of CES just like other former Directors in his tenure as Director e.g.

- (i) Dr. Ashok Sharma, SSO-I was not promoted and he committed suicide after his retirement.
- (ii) All Professors of CES had pleaded to him personally to promote two faculty members namely Dr. S.N.Garg , SSO-I and Dr. Subodh Kumar, SSO-I for smooth running of teaching and he had not obliged.
- (iii) Prof. Avinash Chandra was not given Emeritus Professorship despite recommendation of the Professorial committee.
- (iv) Best short-listed candidate recommended by the Professorial committee was also not selected in CES.
- (v) We had developed a SOLAR ENERGY PARK (SEP) (Photo 2.8) behind block VI funded by Ministry of

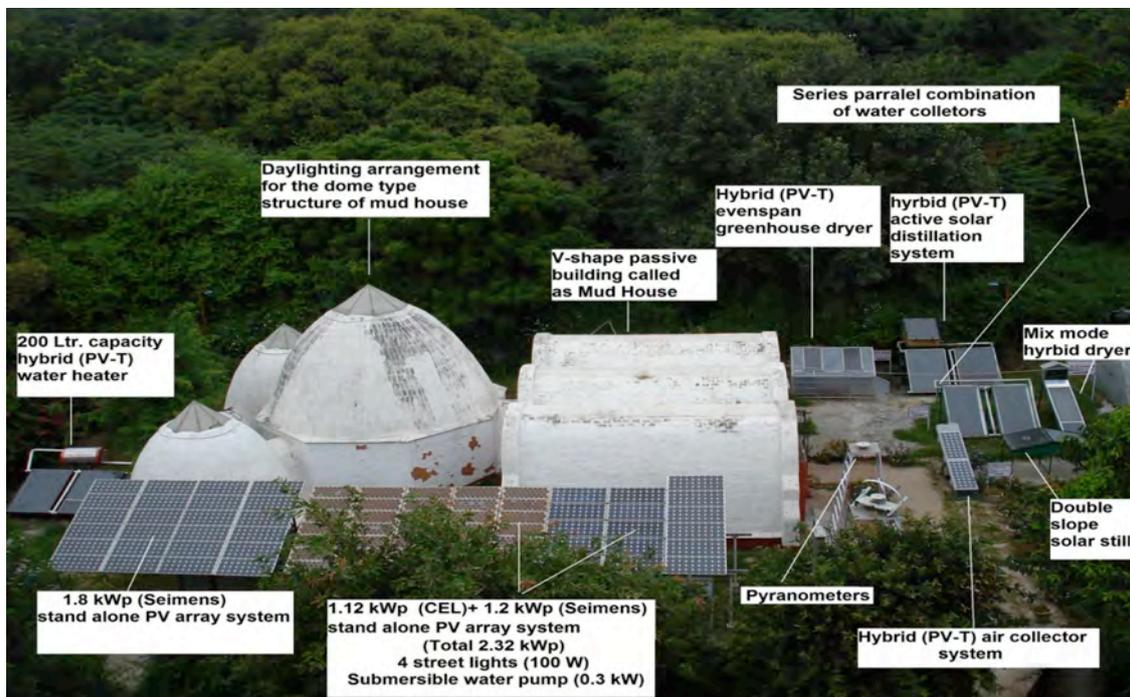


Photo 2.8: Solar energy park

Human Resource Development (MHRD), Ministry of Science and Technology (DST), Indian Council of Agriculture and Research (ICAR) and IIT Delhi in 15 years.

However, I was requested by one of the Deputy Directors, Prof. M. Balakrishnan to clear the solar energy park space till March 31, 2011 (ADDF-124 dated: February 04, 2011). This park was unique in the country and represented rural applications with energy security (Photo 2.9). Till date after four years no work has been started on the area, so vacated.

(vi) I was not given the high academic grade (HAG) in the institute compared to so many juniors. Prof. K.L. Chopra was chairman of the CES committee.



Photo 2.9: Solar drying experimentaion

At this point, I desire to mention that I actively participated in every honor given to Prof. M.S. Sodha by his students and the institute. Two special functions in his honor during tenure of Prof. Prasad namely SOLARIS 2007 and Felicitation of mentor were held.

- (i) In the year 2002, I attended SOLARIS 2002 in UK (Photo 2.10) as a member of SOLARIS 2002 and requested all other members to host SOLARIS 2007 at IIT Delhi to honor Prof. M.S. Sodha on the occasion of his 75th birthday and every member agreed for this function to honor our respected teacher and guru ji.



Photo 2.10: 2002, Solar conference

Further, I, as a general secretary of SOLARIS 2007 (Photo 2.11), had successfully organized an international conference in honor of guru ji to celebrate 75th birthday at IIT Delhi under the chairmanship of Prof. T. Muneer of Edinburg University, UK. About 250 participants including 50 international participants had attended the conference. However, I never got proper support from the Director, IIT Delhi as per my expectations e.g. the special felicitation function celebration held under the chairmanship of Prof. P.K. Kaw, Director, IPR, Ahmadabad, Gujarat on February 08, 2007 at Indian Habitat Centre. A booklet based on the

life of guru ji was also released by Prof. P.K. Kaw. Prof. Prasad was totally influenced by anti -Prof. Sodha's group and hence there were few appointments of new faculty in CES. It is an honor for me that I celebrated Prof. Sodha's birthday every year till date.



Photo 2.11: Solaris 2007 inauguration

(ii) During the golden jubilee celebrations of the institute under the chairmanship of Prof. Anurag Sharma, Dean, Academics, there was a decision that if twenty students/colleagues of any working/retired faculty desired to honor their mentor (teacher), the institute will organize a function to felicitate their teacher (Photo 2.12). In this context, Prof. Sodha was felicitated on March 11, 2011 at seminar hall and I was one of the participants. The institute felicitated him by presenting a shawl and Rs. 50,000/-. After presentation, Prof. Sodha donated Rs. 1,00,000/- (one lakh) along with Rs. 50,000/- (fifty thousand) to institute an award in honor of his parents. This was a unique moment for me that at this age Prof. Sodha remembered his parents. On the same day I also decided to have an award in the memory of my parents. I did the same in the year 2014.



Photo 2.12: Mentor guruji and G.N. Tiwari

After SOLARIS 2007, I was honored with **Vigyan Ratna** by Council of Science and Technology, UP based on my research work.

"For any recognition of hard work, one needs blessing of elders and god/goddess"

This was only due to the blessing of my parents and guru without any **Darbargiri**. This was a highly successful international conference due to funding from government organizations/ministries, Italian embassy and registration fee from participants.

At valedictory *function* of SOLARIS 2007, I also announced to honor guru ji by organizing SOLARIS 2012 in Varanasi during his 80th birthday.

After a great success of SOLARIS 2007, it came to my mind that

"If there is a will for good cause, there is a way and money to achieve the cause will come in an easy way (From known as well as unknown source)"

Hence we decided to form a non-government organization named **"BAG ENERGY RESEARCH SOCIETY (BERS)"** with the help of my esteemed colleagues and research scholars working with me on May 24, 2007 (For details see www.bers.in). One of main objectives of BERS was energy education across the country from rural to urban areas. To generate the funds for BERS, I decided to donate my all savings/income from various sources like consultancy, royalty of books and honorarium etc. to the society.

Followings are the office bearer of BERS:

Chief Patron: Prof. M.S. Sodha, IIT Delhi

President: Dr. G.N. Tiwari, IIT Delhi

Vice President: Dr. A.K. Singh, NGO

Secretary: Dr. Swapnil Dubey, IIT Delhi

Treasurer: Prof. V.K. Dwivedi, UP

Members

Prof. Jagdish Rai, IIT Roorkee

Prof. Emran Khan, JMI, New Delhi

Prof. J.K. Nayak, IIT Bombay

Prof. A.K. Gwal, Barktulla University, Bhopal

Dr. Usha Singh, RU, Jaipur

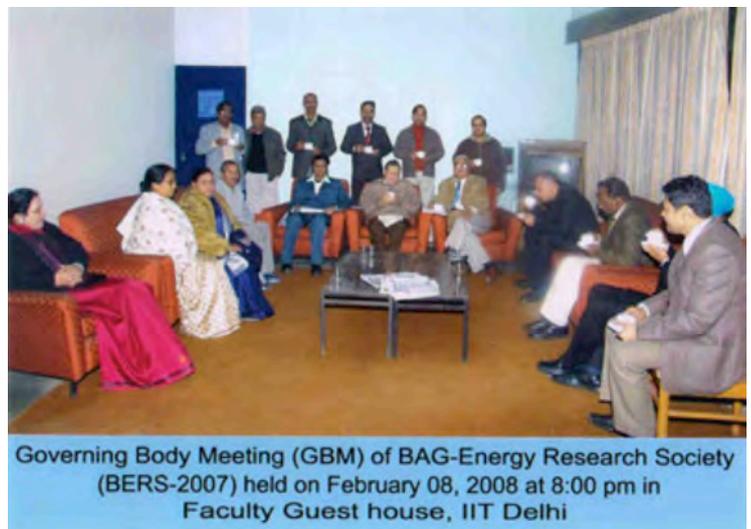


Photo 2.13: BERS, 1st meeting

It was also decided by the management to build an energy efficiency passive building at Varanasi so that SOLARIS 2012 can be held there (Photo 2.13, first meeting). As per resolution, the work started in time.

Further, in the year 2008, I was shortlisted for the post of Director of new eight established IIT's and attended personal discussion on October 23, 2008, at 11:00 AM at the residence/office of Hon'ble HRM at 17, Akbar Road, New Delhi (D.O.No. 22-19/2006-TS.I dated October, 17, 2008). The personal discussion was conducted for few days under the chairmanship of Shri Arjun Singh, Honorable Minister of HHRD. The other members were Prof. C.N.R. Rao, Dr. Anil Kakodkar, Chairman, UGC and AICTE etc. In the whole interview, Prof. C.N.R. Rao was sleeping and only Honorable minister was asking any question. Only Dr. Anil Kakodkar was asking questions and I got the impression that it was only the formality of interview to show that there was proper selection of Directors of new IIT's. Actually it was a show for selection.

Finally on January 26, 2009, only six names for new six Directors were announced after IIT council meeting held in HRDM. My question is what about other two names? If the reasons are known then the whole selection procedure will be exposed. After that I had never been short-listed for the same post till now.

Again I was shortlisted for the post of Director of many NIT's without any success (No. F.24-5/2010-TS.III dated September 04, 2010 (HT)). Same things happened again and again.

To seek the blessings of Almighty, Sodha Mandir parisar (Photo 2.14) was built at BERS in the same year.



Photo 2.14: Sodha mandir complex

From Sept. 28, 2011-June 11, 2015 (Prof. R.K. Shevgaonker)

Dr. Anil Kakodkar, Nuclear Scientist, also chairman, BOG, IIT Bombay was member of most of search committees of Directors of IIT's till recently. Through one of search committee, Professor R.K. Shevgaonker from IIT Bombay was selected as a Director of IIT Delhi who joined IIT Delhi in the month of September, 2011. Prof. Shevgaonker is an honest man. Professor Shevgaonker took many good decisions in the beginning which are as follows:

- (i) He announced in his first public meeting on occasion of republic day that if the faculty and staff have any problems, they can approach him directly.
- (ii) He promoted the faculty left out previously.
- (iii) He has done the beautification all over campus and
- (iv) He supported in creation of new lecture halls etc.

Further, he agreed to inaugurate the new passive building constructed by Bag Energy Research Society (BERS) during SOLARIS 2012 which was organized jointly by IIT Delhi, BHU and BERS in my first meeting with him after his joining IIT Delhi. The SOLARIS 2012 was organized to honor Prof. M.S. Sodha on his 80th birthday. Prof. Shevgaonker had inaugurated the passive building after the name of Prof. Sodha known as **SODHA BERS COMPLEX** on February 08, 2012, birthday of Guru ji (Photo 2.15). After inauguration, Prof. Shevgaonker had visited **SBC**. It is a unique passive building design and constructed by incorporating most of ancient concepts of cooling. Prof. Szyrkowicz Lidia, Scientific Councillor, Embassy of Italy was the chief guest of SOLARIS 2012 (Photo 2.16). The inauguration was at **Swatantrata Bhwan, BHU, Varanasi (UP)**. About 300 participants took part in SOLARIS 2012 including foreign participants.



Photo 2.15: Inauguration of Sodha BERS complex Varanasi, India on february 08, 2012



Photo 2.16: Solaris 2012 at Sodha BERS complex

On the basis of a recommendation of SOLAIS 2012, we submitted a research project through IIT Delhi to install a roof top and building integrated photovoltaic thermal (BiPVT) to DST, Govt. of India. The project was approved and BERS was the lead organization of project. The picture of roof top of capacity 4kWp and BiPVT of capacity 7.5 kWp have been shown in Photo 2.17.



Photo 2.17: BiSPVT panel roof-top at Sodha BERS complex, Varanasi

After success of project at BERS, Varanasi, we have already started the work regarding SODHA ENERGY COMPLEX (SEC) at Ballia (UP) for energy education in rural India.

Sometime later, Prof. Shevgaonker appointed his team to work with him including his roommate at IIT Kanpur, Dr. S.N. Singh as deputy Director (operation). After that, he was totally influenced by local **Darbagiri** of the faculty including Dr. S.N.Singh, DD. The same Darbar has been ruling IIT Delhi since long time. During his entire tenure, most of time he was not available to faculty either junior or senior. I understood that it was a fact that he was not able to handle IIT Delhi properly. This was also felt by me. I sought an appointment with him and I met him in the second week of December, 2014 after considerable time. I explained to him about IIT Delhi in general and CES in particular starting from my experience to date in about one hour which are as follows:

- A proposal to start B.Tech. program in Energy has been in consideration since 80s
- Many faculty members in CES have retired in solar thermal and renewable sources and no selection have been made in this area.
- Plasma science is not a part of energy program anywhere in the world and selection in the plasma had been manipulated by ignoring best candidates in the past
- Some of his associates expressed their desire to merge CES, AS and RDAT
- Some teachers are occupying space in CES without a single day use after occupation of the given space
- In recent selection, after recommendation of the Professorial committee some candidates were not called for interview and the criteria for internal and external candidates had not been same in contrast to the institute rules.
- Some faculty members are bent upon to closing down CES through not selecting deserving candidates
- Even the senate was not able to pass a resolution in the past about requirement of at least one accepted research paper before submission of Ph.D. thesis

- Proposed to find out (i) research activities of senators for last five years and (ii) contribution of Bhatnager awardees after their award
- Reasoning about fall of world ranking of IIT Delhi etc.
- Recently, more and more academic organizations are starting degree program but CES instead of creating a new program as suggested by MNRE closed M.Tech. evening program, with maximum demand.

Finally I came to know that Prof. Shevgaonker had resigned after one week of my meeting with him. Even after his resignation, he appointed one PDF in plasma science in CES

Overall my conclusions based on my experience at CES, IIT Delhi are as follows:

(i) We were not able to attract best hard working faculty due to subjective attitude of administration and other Professors of CES.

(ii) In the name of avoiding inbreeding, we have not given an opportunity to our best Ph.D. students

(iii) Our Ph.D students who had not been given an opportunity, are doing very well in their respective institutions which are now a challenge to CES at National and International level

My apprehensions of decline of science and engineering education were also supported by many Nobel Laureats at Indian Science congress at Mysore University during January 3-7, 2016.

At the time of my superannuating from IIT Delhi on June 30, 2016, I have no regrets of being a faculty member at IIT Delhi and am completely satisfied with the work done. Some of the highlights are as follows:

(i) Published about 600 research publications in journal of national/international of repute.

(ii) Supervised (and am supervising) more than 100 Ph.D. students.

(iii) Coordinated almost every year Quality Improvement Program (QIP) for teachers from other organizations (Photo 2.18).



Photo 2.18: Quality improvement programmes held at IIT Delhi

(iv) Organized two international conferences namely SOLARIS 2007 and 2012 at IIT Delhi and BHU in India.

- (v) Published about 25 books in different areas of renewable energy sources by national /international publishers.
- (vi) Visited many countries like USA, UK, France, Sweden, Italy, Taiwan, etc. as an invited speakers, organizer, experts on short term/long term visit.
- (vii) Shared the "Hari OM Ashram Prerit S.S. Bhatanager" award with GURU ji and my other colleagues.
- (viii) Awarded "VIGYAN RATANA" by Govt. of UP (Photo 2.19).
- (ix) My papers have been cited by about more than 11,000 researchers
- (x) My h-index is about 53.
- (xi) Editor-in-chief, Editor and Associate Editor of many international journal till date
- (xi) Founder President of Bag Energy Research Society (BERS 2007) (www.bers.in)
- (xii) Receiving Life time achievement award by ISAM organized by KNIT Sultanpur in December, 2015 (Photo 2.20)



Photo 2.19: Prof. G.N.Tiwari receiving Vigyan Ratana in the year 2007



Photo 2.20: Receiving Life time achievement award by ISAM organized by KNIT Sultanpur

To achieve these goals, I am thankful to all my students and friends who have supported me financially, administratively and morally, particularly to the following:

Foreign friends

1. Dr. Brian Norton, Ireland
2. Dr. T. T. Chow, Hong Kong
3. Dr. Danny Li, Hong Kong
4. Dr. Christophe Ménézo, France
5. Dr. B. K. Bala, Bangladesh
6. Dr. Tariq Muneer, UK
7. Dr. J. T. Mc Mullan, UK
8. Dr. Wolfram Sparber, Italy
9. Dr. G. Braccio, Italy
10. Dr. Baruch Givoni, USA
11. Dr. Avraham I. Kudish, Israel

Indian friends

1. Dr. Alok Srivastava, USA
2. Prof. T.S. Bhatti, IIT Delhi
3. Prof. Emran Khan, JMI
4. Dr. Prabhakant, IRS
5. Dr. Raghubir Singh, BHU

6. Prof. V.K. Jain, VC, Doon University, Dehradun
7. Dr. V.K. Kaul, CEL
8. Dr. Madan Dubey, USA
9. Prof. Jagdish Rai, VC, Inverties University, Bareily
10. Prof. S.N. Singh, Varanasi
11. Prof. Dinesh Singh, Varanasi

My message to fellow workers and students is as follow:

- Be human being and do any work you like
- If some things go wrong, believe that it is good for your future
- Be faithful to your parents, teachers and elders
- Help others, then help for you will come from unknown sources
- Think many times before harming anybody.
- Strike opponents at appropriate time if needed, otherwise God will take care of them

At this moments, I am feeling the presence of my grand-parents (Mrs. Sugia Devi and Shri Randhari Tiwari) and parents (late Mrs. Bhagirathi Tiwari and Pandit Bashisht Tiwari).

Finally, I would like to thank our guru ji Padma Shree Professor Mahendra Singh Sodha, FNA with my inner voice and feelings for his blessings from the beginning of my career (1977) to my superannuation on June 30, 2016. I expect the same in coming days and years.

Thanks to you all for coming to this thanks giving function.

(G.N.Tiwari)

3.
My
Foreign Assignments

3.1 Italy and Canada

My first visit to a foreign country was to Italy. I visited Sogesta, Urbino, a hill station in Italy, on an Italian Government Scholarship in photovoltaic materials and systems under Indo-Italian exchange program funded by Govt. of Italy (Photo 3.1). The selection was made by Ministry of Human Resource Department (MHRD). The visit was for one month during June 10 - July 08, 1985. A workshop was organized by International School of Solar Energy and Renewable Energy sources, Rome. During the workshop, I also attended an international conference in Montreal, Canada. This was the time when an Air India plane crashed in air while



Photo 3.1: Italy conference

coming from Montreal, Canada. I had to reach after one day of the crash. My journey from Rome to Montreal was very tense particularly when the pilot pointed out the place of plane crash. During the conference, I found that there was no special arrangement for accommodation, food and stay as we do in our country. It was a surprise for me. I did not have much money to visit any place. I had presented my first paper **on a foreign soil**. Our group, lead by Guru ji (Prof. M.S. Sodha) was famous at that time due to the large publications in "Energy Conversion and Management." After the conference, I visited Dr. Alok Srivastava in Washington (for more details see USA section). After my visit to USA, I came back to Italy to complete my course work. At the end of the workshop, we visited industries of PV manufacturing and saw installed PV systems and Milan city.

Prof. Szpyrkowicz Lidia, Scientific Counsellor, Embassy of Italy in India was impressed during her visit to SOLARIS 2007 at IIT Delhi. She had also visited "Solar Energy Park" established behind Block VI of IIT Delhi by our group in the area of many applications of solar energy including low cost energy efficient building. So, she organized my visit to Institute for Renewable Energy of Accademia Europea (EUR.AC research) Bolzano, Italy in February, 2010. For my visit, one day workshop was organized including lunch and dinner with the



Photo 3.2: With Prof. Sparber at Institute of Renewable Energy, Bolzano, Italy

President, Director of EUR.AC and industrialists to discuss more details of collaboration between Bag Energy Research Society and Institute for Renewable Energy. A memorandum was also signed between two groups on February 17, 2010. I had also given a key note lecture on "Low cost building in India and its impact on climate change". My visit was funded by Institute for Renewable Energy. I also visited Institute of Renewable Energy, Bolzano, Italy (Photo 3.2) during 15-18 Feb 2010 to deliver a talk on "Low cost housing".

3.2 United States of America (USA)

First, I had visited USA in the year 1985 to attend an international conference on solar energy in Montreal, Canada. During my visit to Canada for the conference, I had a call from Dr. Alok Srivastava through the conference desk and he invited me to visit Washington D.C.. I said that I did not have sufficient money to visit. He assured me of full funding. I was new to USA and he advised me to contact Dr. S.N. Bajpai who was staying in New York. I went to the residence of Dr. Bajpai and got relieved. After that all arrangements including transportation by bus were made by Dr. Alok Srivastava. It was a memorable visit from New York to Washington and I remember that Alok ji received me personally in early morning. At that time, Alok ji was pursuing his M.S. and staying with his Mama Ji. During my visit, Dr. Alok ji had arranged a meeting with Dr. M.A.S. Malik, our first author of book on "Solar Distillation" published by Pergamon Press and Dr. Malik was working in World Bank in Washington, DC. This was my personal visit to World Bank in the energy project.



Photo 3.3: 2015, USA

Second time, I had been invited as a key note speaker, chairing a technical session as well as one of organizers in the month of September 21-27, 2015 in Orlando, Florida, USA by OMICS group. I had attended this conference with my colleagues namely Dr. R.K. Mishra, Miss Deepali Atheaya, Miss Jasleen Bhatti and Mr. Arjun Dev of CES (Photo 3.3 and 3.4). I had given a key note lecture on PV Modules and Application: A review. Other students had presented their research papers on their respective areas of interest. I had chaired one day technical session in the conference. We had a meeting with the UNESCO representative about collaborative projects in future. All of us were honored by organizing committee members.



Photo 3.4: 2015, USA

After the conference we all visited Washington, DC for three days. Dr. Alok Srivastava was kind enough to seek an appointment with UNESCO officials and arranged a visit to see roof top PV modules system through the lunch/dinners. He had also arranged various site visits in Washington, DC. We all are thankful to him and

his wife for making USA visit memorable in our life time. In fact it was special visit for me in the month of September.

3.3 Papua New Guinea (PNG)

I was offered a position of senior lecturer in University of Papua New Guinea (UPNG) for a period of three years (Photo 3.5). I had joined as energy expert in the month of March, 1987. My family joined me after sometime in April, 1987. My third son was born in July 29, 1988. My responsibility was to teach non-conventional energy course to undergraduate students and to develop solar energy outdoor laboratory which was a part of Physics Department. There was a drinking water problem in the coastal regions particularly during low rain precipitation. We supplied locally made fiber re-enforced plastic (FRP) double slope solar stills to residences in the coastal region. These were used for sea water purification. The cleaning of basin was done in a short interval of one week. We had made an arrangement for that. They were using distilled water without any treatment only for cooking rice, otherwise they were using mostly coconut water during shortfall of rain. During rainy season, they collected rain water from the roof of houses. After few months, my family had decided to return back to India due to local social problems and they returned in June, 1988. I was in UPNG for a period of one more year.



Photo 3.5: 1988, PNG

3.4 Australia

During my visit to UPNG, I had also visited Queensland University, Sydney in the month of June, 1988 for two weeks. They offered me some job which I could not avail due to double salary in Papua New Guinea.

3.5 United Kingdom (UK)

I was awarded European Fellowship for six months by Department of Science & Technology (DST), Government of India to work with Prof. Brian Norton, University of Ulster, Belfast, UK (Photo 3.6). My topic of research was inverted absorber solar still. My period of stay was from January 1993 to June 1993. The group of Prof. Norton was very big and cooperative as far as technical knowledge is concerned and I learned a lot about functioning and working of a foreign University. I shared an experiment on spherical condensing cover solar still for one of the graduate students. Since, I had to come back to India there was an urgent need to fulfil the various components of the experiment. To my surprise, every component came to me within few

days and the whole experiment was ready within a couple of days. During my stay at University of Ulster, Prof. Brian had allowed me to visit Oxford and Cambridge University for exposure to the whole UK. I did the same and I got a view of the entire UK.



Photo 3.6: 1993, UK, with Prof. Brian Norton

My second visit for UK was after 10 years and I visited Napier University, Edinburgh (UK) to attend the international conference on "Solar radiation and modeling" to present my paper entitled "Estimation of Turbidity Coefficient for Indian Climatic condition". Prof. Tariq Muneer was the convener of conference. Top scientists including Prof. A Kudish, Israel, Dr. Danny Li, Hong Kong, Dr. Harry D. Kambezidis, Greece etc. in the area of solar radiation attended the conference and it was decided to hold such conferences in an interval of 2 years. It was the first SOLARIS 2002 (Photo 3.7). The second SOLARIS 2005 was proposed by Dr. Danny Li to be held in Hong Kong. I offered myself to hold conference SOLARIS 2007 at IIT Delhi in honor of Guru ji (Prof. M.S. Sodha) during February 7-9, 2007 under the chairmanship of Prof. T Muneer.



Photo 3.7: 2003, Solar Conference Edinburgh

3.6 Greece

Dr. Harry D. Kambezidis, President, Hellenic Illumination Committee (HIC), Athens, Greece had organized a two day international conference SOLARIS 2005 during May 26-27, 2005 (Photo 3.8). I had been invited to deliver the key note address on "Experimental validation of cloudiness/haziness factor for composite climate". I was also one of organizing members. The theme of the conference was "Solar light advancements in the dawn of the 21st century". During my visit from May 25-29, 2005, the visits of participants were organized in Greece to see underground old ancient building structure by using the Trombe wall concept. After SOLARIS 2005, SOLARIS 2007 was organized at IIT Delhi to honor Guru Ji on his 75th birthday.



Photo 3.8: 2005, Solaris in Greece

3.7 Taiwan

In the year 2006, I was invited to deliver two key note lectures namely one in the Renewable Energy International Symposium held on October 13 and another on October 14, 2006 in NPUST, Taiwan (Photo 3.9). Title of my key note lectures were "Controlled Environment Greenhouse Technology" and "Application of Hybrid Photovoltaic Thermal Systems" during my visit in Taiwan for a short visit (October 8-16, 2006). The invitation was on behalf of President, Kun Shan University (KSU), Taiwan, by Prof. Huann-Ming Chou, Dean of Engineering College. During my stay in Taiwan, we visited two islands for identifying an area of joint research. We found that fish drying in the Island was common to be used as pickles. We suggested that photovoltaic thermal greenhouse dryer can be realisable, sustainable and hygienic for long term storage as well.

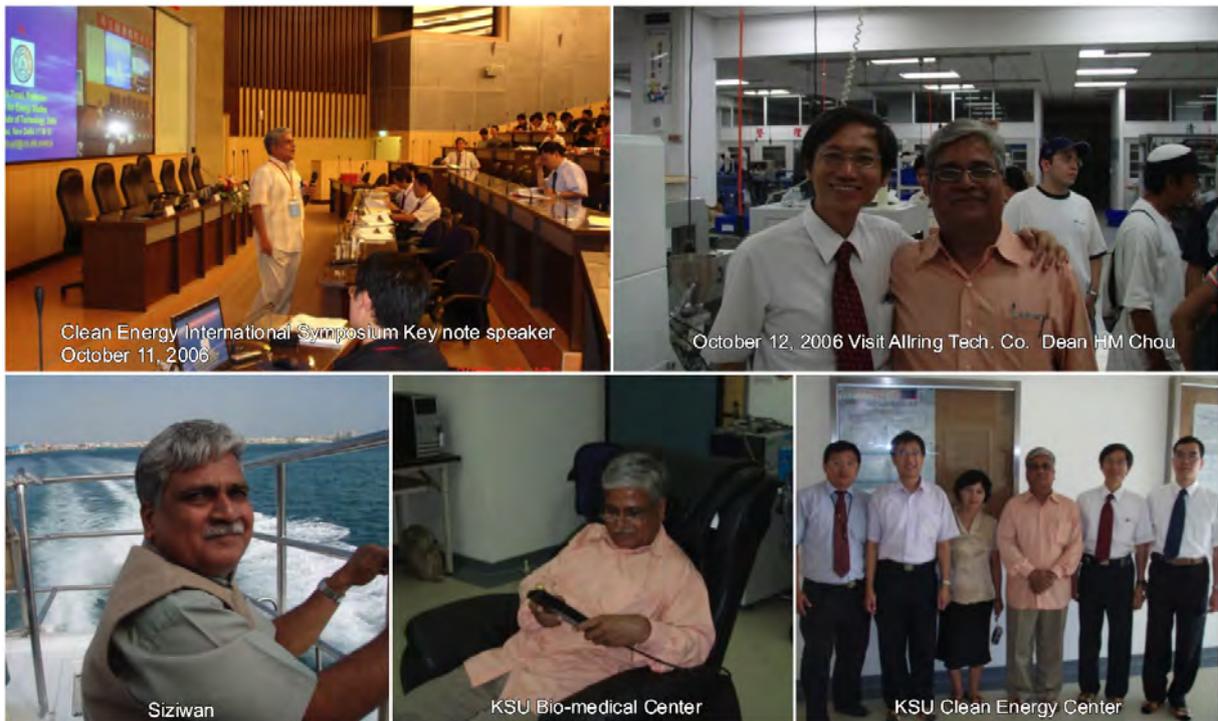


Photo 3.9: 2006, Taiwan

3.8 Hong-Kong

As I had mentioned earlier that during SOLARIS 2002 at Napier University, SOLARIS 2005 , 2007 and 2008 was committed to be held in Greece, IIT Delhi and Hong Kong by Dr. Harry D. Kambezidis , myself and Dr. Danny Li respectively. So, SOLARIS 2008 was held in Hong Kong at City University of Hong Kong during December 4-5, 2008 (Photo 3.10). I attended this conference too with my colleagues Dr. Subodh Kumar, Dr. Swapnil Dubey and Dr. Rahul Dev. I gave a key note lecture on PV systems and its future in India. Dr.Li had made a nice arrangement for every participant in the conference including energy site visit and exhibition.



Photo 3.10: 2008, Solaris in Hong Kong

3.9 Sweden

First time, I visited Vaxjo University, Sweden during May 16-22, 2009 by an invitation from Dr. Krister Hakansson and Prof. Om Praksh, coordinators for joint project to be funded by SASnet (Swedish South Asian Studies Network) (Photo 3.11). There was a meeting between SASnet officials and our joint group of IIT Delhi and Vaxjo University in the area of application of Solar Energy in Indian rural area. In the meeting it was decided to visit some solar energy site before finalizing any projects and its viability. We visited two sites namely photovoltaic roof system and energy efficient building.



Photo 3.11: 2009, Sweden

Second time I had visited Sweden to attend a World Renewable Energy Congress 2011 during May 08-13, 2011 at Linköping, Sweden (Photo 3.12). I attended this conference with Dr. Prabhakant, Dr. R.K. Mishra and Dr. Sanjay Agrawal as participants. In this conference, there was an arrangement of snacks and lunch every day, however being vegetarian, we were not able to enjoy much. But after the conference, we visited many places including energy related sites. I would like to mention here that Sweden is greenest and cleanest country in the world. The use of biomass in construction of building is more popular and the roots of tree is used for space heating of buildings. The managing of ecology in Sweden is planned and managed carefully every year. We had also visited Finland by sea route.



Photo 3.12: 2011, Sweden

3.10 Thailand

First time, I was invited to serve as a panelist in 2009 for annual ProSPER.Net-Scopus Young Scientist Award Symposium for the category of Engineering and Technology to be held at School of Management, Asian Institute of Technology, Bangkok, Thailand on June 03, 2009 (Photo 3.13). I was also invited to deliver the key note address. I was also observer in ProSPER.Net Board meeting. My invitation was from Prof. Peter Haddawy, Vice President for academic Affairs, AIT Bangkok, Thailand. During our visit, we had seen many sites based on energy with much more development work in Thailand.



Photo 3.13: 2009, Thailand

3.11 Turkey

In the year 2010, I attended the 5th international Ege Energy Symposium and Exhibition (IEESE-5) held in Denizli, Turkey during June 27-30 (Photo 3.14). I was the session chairman for "Solar Energy" section on June 30, 2010. There was an executive committee meeting of the Editorial board members of International journal of "Energy Research"..



Photo 3.14: 2010, Turkey

A representative of John Willey, publisher of the journal, was also present. It was a successful meeting about broadening the areas of research to be included in the journal. Prof. I. Dincer, University of Ontario Institute of Technology, Canada, had chaired the meeting and he was authorized to take appropriate decisions in the matter including online publication. All participants visited various historical places including the use of underground hot spring for space heating. Most of residential buildings were using domestic solar water heating for hot water to save the conventional fuel

3.12 Shanghai, China

In the year 2010, I was again invited to serve as the chief panelist for the annual ProSPER.Net-Scopus Young Researcher Award Symposium by Reed Elsevier Information Technology (Beijing) Co., Ltd. Elsevier Division, China (Photo 3.15). My selection was based on my contribution in the research field of Energy powered by SCOPUS in Elsevier journals. I was a chairman of award energy category which was held on July 5, 2010. There were four category of awards. One of them was on Energy. Each awardee was supposed to spend one year in Germany with full financial support by German Ministry of Education and Research. I had also delivered a key note address on energy activity in India before presentation by each finalist in the energy category. After presentation by finalists from energy category, Dr. S Venkata Mohan from Indian Institute of Chemical Technology, Hyderabad, India was given first prize. My trip was funded by Elsevier Beijing office.



Photo 3.15: 2010, China

3.13 France

Prof. Christophe Menezo, Head, INSA Chair, (Lyon/Electricity of France) invited me for conducting a Ph.D. Viva of Mr. Patrick Dupeyrat on July 01, 2011 (Photo 3.16). In addition to Ph.D. viva, there was a conference on "Hybrid PVT solar components" on July 04, 2011. The participants were French, Indian, Hong Kong scientists and industrialists. After Ph.D. viva and invited talks in the conference, it was recommended by the committee that in view of energy crisis, PVT Technology will play an important role and there is strong case to continue research in the area of PVT Technologies including PVT water/air heaters, PVT greenhouse cultivation/dryers and Building integrated PVT (BiPVT) systems etc... Prof. T.T. Chow had also attended the conference and the Ph.D. Viva.



Photo 3.16: 2011, France

3.14 Bangladesh

I had delivered an invited talk on "Photovoltaic Thermal Systems and its applications" in the international conference in Bangladesh on 5th-6th sept, 2014 (Photo 3.17). I had the opportunity to meet Prof. R.S. Prasad, he is known for his exemplary work in photovoltaics. I attended the conference with Mr. Shyam and Mr. Arjun Deo.

3.15 Holland (Netherlands)

I was invited as an expert for Ph.D. ceremony during my visit to Delft Technical University (DTU), Delft, Netherlands, during February 10-15, 2016 (Photo 3.18). I also delivered a lecture on solar distillation in Department of Chemical Engineering, DTU on February 11, 2016. Further, I have also visited many sites including wind power and greenhouse technology used for agriculture



Photo 3.18: 2016 Netherlands

also had a brief discussion with Prof. Dr. Ir. R.F. Munde, Promotor and Prof. Rector Magnificus, Chairman of DTU in renewable energy in India and Netherlands. Further, I have also noted that most of residential and commercial buildings have used the maximum exposed walls with single/double glass window for space heating and minimum heat losses during day/night.



Photo 3.17: 2014, Bangladesh

purposes. The Ph.D. ceremony was a unique experience for me. All experts are referred as opponents to ask questions from Ph.D. candidates. The Ph.D. ceremony starts with gown with different color and code into senate room as per guide lines (Photo 3.19). It takes one hour for complete ceremony. It is just like Indian University convocation for single student. Each day there are three Ph.D. ceremonies arranged by DTU, Delft. I have also visited library of DTU and found that grass was used to cover the roof of a building from greener point of view which I think is must for our country for roof cooling point of view. I



Photo 3.19: After ceremony of Ph.D. viva

4.
Message
from
Colleagues, Friends and Students

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TRIBUTE TO PROFESSOR G.N. TIWARI

I initially became acquainted with Professor Tiwari through his numerous scientific publications. Our research interests have overlapped and, consequently, over the years (I would guess, close to 40 years) we followed each other's publications in the field of solar energy. We both have published papers dealing with low-grade conversion of solar to thermal energy, viz., solar collectors, solar distillation, solar greenhouses and solar irradiation data analysis. I had the pleasure of meeting him in person at the first SOLARIS Conference at Edinburgh, Scotland in September 2003. The topic of the conference, actually more of a workshop, was *Measuring and Modeling Solar Radiation and Daylight*. Since then we have meet at subsequent SOLARIS Conferences, the highlight being that held at ITT, New Delhi in 2007. I also had the pleasure of being an outside examiner of the thesis for a number of his students at ITT. It was obvious from their work that Professor Tiwari is not only an outstanding researcher but also a gifted teacher. In addition to all this, he is a very warm and friendly person and it is always a pleasure to be in his company. The fact that he has chosen to devote his valuable time for Energy Education through Bag Energy Research Society (BERS) in the rural area of India further attests to the remarkable person that he is. I wish him only the best in his future endeavors.



सत्यमेव जयते



**National Institute of Food Technology
Entrepreneurship and Management**
(A Deemed to be University-Under De-Novo Category)
MINISTRY OF FOOD PROCESSING INDUSTRIES,
GOVERNMENT OF INDIA

Dr. AJIT KUMAR, I.A.S. (Retd.)
Ph.D.IIT-D
Vice-Chancellor

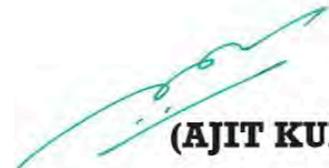
Dated : 21st April, 2016

Prof. G.N. Tiwari is one of the most learned, highly decorated and very effective Scientist, Innovator, Teacher and Guide. It was a great learning experience as well as exposure with him to large number of Innovative Concepts in the field of Renewable Energy in general and Solar Energy in particular.

Especially in the case of Food Processing Sector, the contribution of Prof. Tiwari would go down as an important mile stone, since Solar Energy could be one solution to the problems of farmers in the villages in the light of non-availability of grid power (or quality power) in our rural areas.

The human touch in Prof. Tiwari's interpersonal relationship even with students is exemplary.




(AJIT KUMAR)

Alok Srivastava, Ph.D.
Technical Fellow, Engility Corp
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Tiwari Ji, an Incomparable Personality and Great Mentor

It is with a deeply grateful and humble heart that I write this short memoir to the career of Tiwari Ji on the occasion of his retirement.

Life has an interesting way of bringing people into our lives when we need them. In 1977, at the age of 19, I stumbled at the Center of Energy Studies (CES). In those days, it was located on third and fourth floors of the IITD main building. Guru Ji (Prof. Sodha) assigned me to work in the Solar Energy area. S.C. Kaushik Ji was the team lead and Tiwari Ji shared office with him on fourth floor. As two of us from the same town of Varanasi, we developed a quick bond. It soon became clear that Tiwari Ji would become my pseudo-older brother; I approached my opportunities at IIT with the arrogant, but naïve, attitude of a young person. My position in research lacked the luster of my childhood dream, which was a career in journalism. As soon as I completed my tasks for the weekdays, I would disappear to my uncle's house on other side of the Delhi (who at the time was Dean, Science Faculty at Delhi University) to take in stories in the newspaper and media.

Noticing my less-than-enthusiastic approach to work, one day Tiwari Ji sat me down for a mentoring moment. With the patience of the older brother I never had, he explained the importance of appreciating the opportunities I held. Being a student of Guru Ji, was an opportunity other people dreamed of. Even if I chose not to pursue a career in academics, the Ph.D. with my name would carry into my career. I would become a man worth respecting. He stressed that the work we are doing in Solar Energy had huge humanitarian implications. Our project held the potential to deliver huge changes the lives of under-privileged around the world. I remember this day with gratefulness and fondness. I will always appreciate having him in my life to remind me of not only my own privilege, but the impact I could make on the world.

Tiwari Ji is a man who has always worked hard. He has always held an unshakable dedication to his work. He has always been a man to reach out to help others. I may never have been able to reach his level of dedication, but I spent every day trying to emulate him. I learned to give every day my one-hundred percent. I learned my strengths and weaknesses. When I look back on this period of life, I appreciate how much I learned and grew. Without Tiwari Ji, I may have been a very different man.

When you are giving any project your complete dedication, you gain a special kind of camaraderie with your team. I gained friends here, people like Nayak Sahab (Prof. J.K. Nayak), Kandpal Ji (Prof. T.C. Kandpal), Ashvini Kumar Ji, Bansal Sahab (Prof. P.K. Bansal.) people with minds like mine. People who grew with me. We would spend time at Evergreen at IIT Gate in the evening before going back to CES. We would work until midnight. Our work had us spending all kind of hours at the research facility. Many times we spent whole night at CES and/or sleeping on open ground where experiments were conducted. We still laugh at the event of those days- most notably meeting Indira Gandhi while she examined CES solar thermal equipment's at Teen Murti.

When he became regular faculty, his family Bhabhi Ji (Kamlavati Tiwari) and his two sons at time moved to Delhi from Varanasi and I became part of their family. I watched him care for his family with the same dedication and love he applied to his work. In later years, he cared for his parents and siblings.

In 1982, I left my academic cocoon to move to Washington DC in a climate not conducive to solar research. Solar Energy had become my passion, but with a heavy heart I pursued further education and found myself on a Flight Simulator project for the US Navy. I was not happy to move away from Solar Energy but I have to accept my new career path, I've spent 34 years as a Washington, DC resident. In those years it is only natural to have grown and changed. In those years, I became a husband and a father. I've been a brother; I've been a passionate volunteer. I've been a community leader. In every role, I have tried to emulate Tiwari Ji. I have learned to give every aspect of my life my full dedication.

Some consider him as an outspoken person, but he always stands for what is right and true. I've watched him become a beloved leader and incredibly loyal friend. My relationship with Tiwari Ji has been a precious gift. His influence has stayed with me through every period of my life. This is the mark of an extraordinary teacher and mentor. I am sure his retirement will not slow him down. He will continue to have a remarkable influence on the community, his students, and his peers. I will always be grateful that he found me worthy to be part of the Bags Energy Research Society (BERS) chaired by Guru Ji.

My family and I wish him a healthy, happy, and blessed retirement.

There is no man who deserves it more.



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Dr. A K Singh

M.Sc.(IITKanpur/Phy),M.Tech.,Ph.D. (IITDelhi/ Energy)

CHAIRMAN

Today why has a professor like Dr. G. N. Tiwari from a very humble background, numerous achievable to his name in terms of scientific papers in renowned international journals (#560), distinguished awards (#2) and Ph.D (#78) & M.Tech. (#30) students supervised by him?

To my mind it is neither only because of his honesty, dedication and unmatched tenacity of the purpose nor tremendous knowledge and creativity which transformed lives of many students.

Dr. Tiwari was one of the professors at IIT Delhi who I found sacrificed his administrative ambitions and kept himself away from its conundrums and complex intricacies which provided him undivided attention to devote with the students and take personal interest in their pursuit.

In recent years, educators and policy makers have thought a lot about what makes science and technology uninviting or intimidating to newcomers. There are lots of reasons for this, one of them is a [lack of mentorship](#). Professors especially are considered brilliant scientists first, humble humans second. Prof. Tiwari was an admirable mentor who inspired many to explore renewable energy under his guidance.

I feel extremely honored to be his student and express my gratitude towards him and his family who always showered their blessings on me like a family member.

The precious moments spent with you sir, will always be cherished by us and you will remain our scientific hero.

Dr. A K Singh



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Email: anilkumar76@gmail.com

Date: 20.04.2016

My personal views about My Teacher Respected "Prof. G.N. Tiwari" on his superannuation

I finished my Ph.D. 09 years ago under your guidance. I came to know that you are retiring from long services of CES, IIT Delhi. I am feeling sad. The reason that I have so perfectly adjusted in IIT Delhi, because you were my introduction to it.

Today, I am writing to let you know that I am very appreciative of how you mentored me since I was in IIT Delhi. I have looked up to you for as long as I can remember and it makes my heart heavy to know that you will not be around there anymore. I would like to thank you for all that you have done for me personally and academically – not every professor has a heart big enough to guide their students in every aspect of life. I am sure that my life's tree will branch out beautifully because its seed have been sowed by a professor and nurturer like you.

As you retire, take a moment to stroll through your beloved hallways of Centre for Energy Studies. You'll hear every nook and corner sadly whisper 'we'll miss you'. Your retirement is not just a big loss to us, but a big loss to the IIT-Delhi. Professors like you are the real assets who make ordinary students grow up into outstanding citizens. Your teachings will forever be treasured, your contribution in our lives can never be measured.

Last but not the least, we saw this coming, but we were in denial. You might think we're, pushing it a bit too far. But you were truly, IIT's shining star. Without you... how will we thrive in IIT Delhi? I thank destiny for sending such an awesome mentor my way.

Faithfully yours,

(Anil Kumar)

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Ref. No.:

Date:

Respected Prof. G. N Tiwari, is an ever shining star in the field of solar energy. I have worked under guidance of respected "Guruji". His motivations help a novice person to perform with maximum achievements. His untiring work inspires all researchers.

The research works and published papers of respected Guruji in international journals are like lampposts in the darkness which will show the path of innovative ideas in the arena of solar energy.

I was almost new in the field of solar energy I learnt so many things in his guidance and company. I learnt how to remain honest with one's profession, dedicated to the work assigned and being respectful to the colleagues. The most noteworthy quality which I learnt from him is innovation.

Only an innovative person can keep his knowledge update as new innovations and researches are being done everyday. Despite such honorable qualities he is a man of sincerity, honesty and dedication, his heart is bubbling with love and compassion for the welfare of whole society.

A person with dedication may retire from job, but never tires from serving the society. I wish him a long and healthy life after retirement.




20/04/16
(Dr. Anil Kumar Singh)
Principal
N. G. P, Patna-13

Dr. Ankita Gaur
Research Scientist
CETHIL (Centre d' Énergétique et de Thermique de
Lyon),
UMR5008 CNRS,
French National Institute of Applied Sciences (INSA)
Campus scientifique La Doua
Bâtiment Sadi Carnot, 9, rue de la Physique
69621 Villeurbanne Cedex – France



I am feeling fortunate to write about Prof. G. N. Tiwari. I am one of his Ph.D. students and I consider myself very lucky that I got the opportunity to do Ph.D. under his supervision. I got registered for Ph.D. in IIT Delhi in 2010 and got the degree in 2014. He supervised me in doing research in building integrated photovoltaic thermal systems. He was not only my Ph.D. supervisor but also my mentor and guardian. I have found him not only a great teacher but also a great scientist and a soft hearted highly social personality. He owns a major share in making me whatever I am today and I am truly indebted to him. On his superannuation I am feeling happy that he successfully completed his official tenure and served the nation in a great way by producing a number of first class Ph.D. and M.Tech. students and contributed by doing high quality science. I congratulate him for the same. He has always kept blessing me and other students and showed us right direction to become not only good researchers but also good human beings and I hope the same will continue in future as well. Though he is superannuating form his Government Job but I know that his service to the nation is not over yet because such people never retire. I know he will continue his contributions in science and service to the nation in one way or other and will keep guiding and showing right path to the people of next generation. Though I feel myself so small that I cannot do much for him, but wish him a long life, good health and a very happy post retirement life. I wish he has a great time ahead with his family and friends. I wish him all the very best.



Dr. Atul Sharma
Assistant Professor
Rajiv Gandhi Institute of Petroleum Technology
(Institute of National Importance established under the Act of Parliament)
Rae Bareli-229316 (U.P.), India

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I am in touch with Prof. G.N.Tiwari Since 2001. I had also visited the 'Center of Energy Studies and Research, IIT Delhi' in September 2002. During this time, first time, I came to know that, Prof. Tiwari is doing a lot of activities related to solar energy and at the same time, I had very good interaction with his research scholars.

Again in April 2006, I had visited his lab related to the solar thermal, greenhouse, hybrid PVT systems along with Prof. C.R. Chen and Prof. H.H. Chou (Dean, College of Engineering) Kun Shan University, Taian, Taiwan. Later, in October 2006, Prof. Tiwari was invited by the Department of Mechanical Engineering, Kun Shan University, Tainan, Taiwan to deliver a 'Key Note' speech during the Renewable Energy International Symposium, which was held on October 13, 2006. During this time, we also had a good interaction with each other.

During 7-9. February 2007, I had visited his labs and at this time also attended international conference "SOLARIS 2007" at IIT Delhi along with Prof. C. R. Chen. Later, during the international conference "SOLARIS 2008", which was held during December 4-5, 2008, I again meet Prof. Tiwari at City University of Hong Kong, Hong Kong, PROC. We spent whole time together along with his Ph.D. scholars, who were also attending this conference at Hong Kong.

Since, 2009; I am working at Rajiv Gandhi Institute of Petroleum Technology, Rae Bareli, India and having a regular touch with Prof. Tiwari. I had also participated in conference "SOLARIS 2012", which was held during February 7-9, 2012 at Varanasi, U. P., INDIA, organized jointly by the Bag Energy Research Society (BERS), Indian Institute of Technology Delhi (IITD) and Banaras Hindu University.

In the last, I would like to say that Prof. Tiwari working style is too good as well as his behavior also nice. He is always polite with everyone. He is having nice management and communication skill, that's why he organized many international conferences at IIT Delhi. I am highly impressed by his behavior and pleasant environment in his research lab within many Ph.D. scholars.

Date: 9th February 2016
Place: Rae Bareli, U.P., India

Atul Sharma

Dr. Atul Sharma





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OIFIG AN UACHTARAIN / OFFICE OF THE PRESIDENT:

Solar energy research, education, dissemination together with many instances of its practical implementation have been underpinned by Professor G.N. Tiwari's outstanding work. However, the extent of the use of solar energy, and the drivers and requirements of that research, have all changed radically over the course of his very distinguished career. His early research established understanding of fundamental behaviours and analytical techniques for what, then, many perhaps considered a curious, but far from mainstream, disparate set of potential applications. Professor Tiwari contributed seminal to the development and use of the common analytical frameworks that underlie the behaviour of devices from solar stills to solar coolers and from pressure solar features of buildings to crop dryers.

Today solar energy research now supports a burgeoning global industry. That new set of contexts has presented new research challenges arising from emerging applications or the opportunities presented by the properties of new materials. Today many of the underlying economic barriers to harnessing sustainable sources of energy have fallen environmental imperatives becoming ever stronger. Other motivations have altered completely, many students no longer have part an "interest" in solar energy; they see it as a rational career choice. The many students the Professor Tiwari has mentored and experienced are, I know, forever grateful for his insight, experience and vision.

Professor Tiwari has been at the heart of all these changes. His research, teaching and extensive contributions to the literature have both led and reflected the development of solar energy use. His students populate academia and carry-on a proud tradition of rigorous insightful research of the highest international standards that underpins India's rightful strong position on this critically important field.

A handwritten signature in black ink, reading "Brian Norton".

Professor Brian Norton 22nd December 2015



राजकीय अभियांत्रिकी महाविद्यालय बीकानेर GOVERNMENT ENGINEERING COLLEGE BIKANER

(An Autonomous Institution of Government of Rajasthan)

My Journey with Professor G.N. Tiwari



Assistant Professor

Department of Mechanical Engineering

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"It is the supreme art of the teacher to awaken joy in creative expression and knowledge-Albert Einstein"

It's been a great honour for me to have an opportunity to express my thoughts about my respected Guru ji Prof. G.N. Tiwari. My Journey with Guru ji has started when I joined him as a research scholar at CES, IITD. Initially it took some time to tune up with the system but soon everything got streamlined, only due to love and care of Guru ji. A good teacher explains but a great teacher inspires, he has always been a great source of inspiration to me and I have learnt a lot under his able leadership and guidance. His simple and positive approach towards solving complex problems, either in education or life has always impressed me and I always try to adopt this approach in my life.

He is a kind of personality who has a great International reputation, his contribution to the institute and the society is aw-inspiring. His caliber can be well understood with the following stats, more than 500 research publications, umpteen number of reviews published in leading national and international journals, supervision of more than 65 PhDs and authoring over 20 books, the thing more surprising is that the figures are still increasing!!! Nothing can stop him except himself. Prof Tiwari has made outstanding contributions in the areas of solar thermal, photovoltaics, solar distillation, water/air heating systems, greenhouse technologies, Earth to air heat exchangers, passive building and hybrid photovoltaic thermal systems, climate change, energy security, etc.

Besides academic knowledge, I have also got an opportunity to hone my administrative skills while working under his team of International Conference SOLARIS-2012, Short Term Courses and workshops. Prof Tiwari is a very kind hearted, encouraging and a down to earth person and I consider myself fortunate to learn under his able guidance and mentorship. His valuable advises will always help me excel in my life. I wish him a long, healthy and prosperous life ahead.

Dr Chandra Shekhar Rajoria

Karni Industrial Area, Pugal Road, Bikaner-334004 (Raj.)

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I am in touch with Prof. G.N.Tiwari Since 2006. I had visited the ‘Center Of Energy Studies and Research, IIT Delhi’ in April 2006 along with Dr. Atul Sharma, who joined my research group in August 2005 and informed me about Prof. Tiwari research work. I had seen his whole research labs related to Solar Energy and its applications in solar distillation, passive heating/cooling of buildings, controlled environment greenhouse, aquaculture, water/air heating system, crop production and drying etc. Later, in the October, 2006 Prof. Tiwari was invited by the Department of Mechanical Engineering, Kun Shan University, Tainan, Taiwan to deliver a ‘Key Note’ speech during the Renewable Energy International Symposium, which was held on October 13, 2006.

Prof. Tiwari working style is very methodological and planned well in advance. Prof. Tiwari organized many times international conferences at IIT Delhi and BHU, U.P. As per my knowledge, Prof. Tiwari wrote many textbooks on the solar energy theme. I am highly impressed by his personality and friendly culture in his research lab within many Ph.D. scholars.

With Kind Regards

Yours Truly

陳長仁 Chang-Ren Chen,
Ph.D. Prof.,

Dept. of Mechanical Engineering,

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FB:陳長仁崑山科技大學 機械系 教授 台南市綠能產業服務分團 副分團長 台灣綠色科技聯盟 秘書長



chang-ren chen <crchen369@yahoo.com> 於 2015/12/8 (週二) 3:28 PM 寫道:



Prof. Christophe Ménézo
University of Savoie Mont-Blanc
LOCIE UMR CNRS 5271
Campus scientifique Savoie Technolac
Bâtiment Helios- Avenue du Lac Léman
73 376 Le Bourget du Lac

Le Bourget-du-Lac, April 22nd 2016

Professor Gopal Nath TIWARI

It is a great honor to have the privilege of writing about Professor Tiwari. His accomplishments and contributions to the field of solar energy have established his worldwide recognition that merits distinction of the highest level.

His accomplishments are huge on all the assignments of a professor i.e. teacher and researcher. Regarding teaching the breadth of his work goes far beyond the education program he built at the Centre for Energy Studies, IIT Delhi. The books he has written are used in reference for many training on renewable energy around the world. I personally inspired for courses on solar energy and I reference them for my students at the Engineer school.

His research career is impressive in light of all the subjects he led. Throughout his career he has innovated both on the topics covered and on the means to implement to meet these great challenges through a balanced research activity between academic and applied physics. He was visionary on many topics related to solar thermal field. He actively conducted his scientific work and his passion for the benefit of significant social and environmental impacts: solar distillation, greenhouse technology for agriculture and energy production, ventilated geothermal heat exchangers, hybrid photovoltaic/thermal solar collectors, ... on which we had several interactions with my PhD students over the past years.



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Professor G.N. Tiwari through the quality of the work he has carried as well as the quality of doctoral students he supervised is internationally recognized. He has passed on his knowledge to many students among which some also conduct prestigious carrier. Taken together all his scientific activities leads to extraordinary records.

Professor Tiwari always willing to unselfishly share his expertise and knowledge. It was the case with me on photovoltaic/thermal solar collector. He made me the honor to review of the PhD work of one of my students (P. Dupeyrat, 2011) and trusted me to review research of several doctoral students he supervised. He also invited me as a honor guest at the Solaris 2012 that he organised in february 2012 at Vanarasi, India. During this event, a new building with very high energy performance was inaugurated and has a plaque where are inscribed the names of the guests of honor. Those memories are unforgettable and will remain engraved in me. All the attention and kindness he has shown are enormous and full of generosity.

Professor Tiwari is a senior researcher and also leader who knew how to be visionary to lead on research in the field of energy and the building that today turns out to be at high impact societal. Such a great person never stops and I am confident that his country and I hope the world will still benefit from his inexhaustible energy. I sincerely wish him all the best.

With my warm and sunny regards,



Pr. Christophe Ménézo
Deputy Head of FédEsol FR CNRS 3344
LOCIE lab. UMR CNRS 5271/Univ SMB
National Institute of Solar Energy, France



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Time flies and just to learn that Professor Tiwari will be superannuated in mid-2016. I know Professor Tiwari very well and he is one of my academic referees helping and supporting me. We first met in September 2003 when I attended the 1st SOLARIS (SOLARIS 2003), an international conference held at Edinburgh, Scotland under the chairmanship of Professor Muneer who introduced me to him. In this conference, he presented the solar radiation data recorded in India and discussed the implications on solar energy applications. The purposes of the SOLARIS were to elucidate the state-of-the-art in solar radiation and daylight resource modeling and applications, and to establish a working group of experts to meet and address the technical issues in this field. We were the founding members of the SOLARIS and met together in the 2nd SOLARIS (SOLARIS 2005) held in Athens, Greece in May 2005. The 3rd SOLARIS (SOLARIS 2007) was held in Delhi, India at the Indian Institute of Technology and Professor Tiwari was the organizing secretary and the Editor-in-Chief of the proceedings. I attended the conference with my colleagues and students and it was the first time to India. I was the organizing secretary of the 4th SOLARIS (SOLARIS 2008) which was held between 4th and 5th December 2008 at the City University of Hong Kong, Hong Kong Special Administrative Region, China. Professor Tiwari came with a number of his colleagues and students and it was the first time that he came to Hong Kong.

Professor Tiwari is the expert in the field of Renewable Energy in general and Solar Energy in particular. He is the editorial board member, associate editor and editor for a number of international journals of repute. I am sure that he had reviewed a number of my papers before accepted for publication. Professor Tiwari had been the external examiner for a number of my research students who successfully gained their awards.

I will always remember the days I met Professor Tiwari. I continue to benefit from his personal wisdom and solar energy expertise and hope he will enjoy the time in the Bag Energy Research Society.

My heartiest congratulations and best wishes for his superannuated life

A handwritten signature in black ink, appearing to read 'Danny H W LI'.

Danny H W LI
Associate Professor
Department of Architecture and Civil Engineering
City University of Hong Kong



In December 2008, in Hong Kong for the 4th SOLARIS event



योग: कर्मसु कौशलम्

IN PURSUIT OF PERFECTION

Vivekananda Institute of Professional Studies

(Affiliated to Guru Gobind Singh Indraprastha University, Approved by AICTE, New Delhi)

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Date: 29.03.2016



A teacher is the precious gift from God who shapes up the whole life of the students through their knowledge, patience, love and care. They try their best and do all efforts in helping students to achieve their goals in life. In a season of thankfulness I'd like to let you know sir, how appreciative I am to have a teacher like you. It's said that 'Gratitude opens the door to the power, the wisdom and the creativity of the world. You open the gate through gratitude. Your enigmatic personality always lighted in me a will to learn more and excel in life. With all your experiences and knowledge you have helped me climb the ladder of success.

From the very first day when I stepped my foot in IIT, Delhi you supported me. As a great teacher you always inspired me to achieve pinnacle in my chosen field. Sir you understand our problems and deal with us in both ways personally and professionally. I learned a lot from you because you made extra efforts to explain things clearly. You gave me the extra help I needed. Thank you for giving me your time. You have and will continue to be a great influence on me.

Sir you have always been a beacon of hope for me. You were the one who lit my path towards the sunlit path of knowledge and always guided me. I don't owe my professional success to my destiny, courage, luck, belief, confidence or fortune. I owe it to a wonderful teacher like you. The best thing about having you as a teacher is that I'll benefit from what I've learned the rest of my life. You've given me knowledge and skills for life. I consider you not only the best teacher that I have ever had, but also the best mentor I have ever had. Having met you I can only say "A teacher effects eternity, he can never tell where his influence stops."

Thanks and Best Regards,

Dr. Deepali Kamthania, Associate Professor **Vivekananda School of Information**

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SHARDA
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SCHOOL OF ENGINEERING & TECHNOLOGY

About My Respected and Beloved Professor

As I recall my journey of pursuing the Ph.D programme at IIT Delhi during the period 2007-12, my memories centre around one unforgettable name that of Prof. G N Tiwari. I will forever be grateful for the faith he had placed on me as his Research Scholar. As a Supervisor of my Ph.D work, he immensely impacted my life. I am not sure that I will ever meet a teacher so selfless, caring, affectionate and so much concerned about the success of his students. His words, directions and his timely advice had been greatest learning tools, I could have ever had at IIT Delhi.

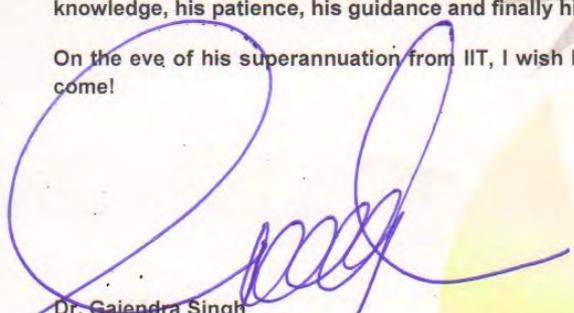
Learning from a great teacher like him has been an experience that can sometimes be much more profound than education itself. He has given me just that. I know teachers like him are not easy to find. I appreciate his time, his patience, his ability to make a difficult subject interesting and easy. I especially loved how much he always related the lessons in my Course Work subjects to real - life examples which always made more logical sense.

Because of his sheer dedication to his students and Research Scholars, he truly is a Stand-out Professor. I have no apprehension in confessing that without him, I never would have been able to understand the intricacies of the subject of Solar Energy. I always counted on him for that extra help and repeated clarifications over the observations & comments of Reviewers of various research papers. The patience he exhibited during many iterations of draft research papers spoke abundantly about his generosity and kindness.

I look back upon that time which I spent travelling with him between IIT and Himgiri apartments where he lived. Those sessions were so important in the development of the person that I am today. Along with Science and Technology, he taught me discipline, he taught me dignity. He taught me that I could achieve more than what I or other people thought that I was capable of. For those lessons, I owe him so much. He inspired me to keep moving forward. And he inspired me to never give up on anything.

I take this opportunity to thank him so much for his dedication, his assistance, his help, his knowledge, his patience, his guidance and finally his supervision of my research work.

On the eve of his superannuation from IIT, I wish him the best of health and happiness in years to come!


Dr. Gajendra Singh
Associate Dean
Professor & Head (Electrical & Electronics Engg.)
SET
Sharda University, Greater Noida.



UNIVERSITY OF KARA

FACULTY OF SCIENCES ET TECHNIQUES



N°...../...../UK/FaST

REPUBLIC OF TOGO

WORK- FREEDOM- HOMELAND

PERSONAL VIEW ABOUT PROF. G. N. TIWARI'S ACADEMIC CONTRIBUTION IN THE FIELD OF RENEWABLE ENERGY

I spent three months in the laboratory of professor Tiwari at the centre for energy studies (Indian Institute of Technology Delhi IIT Delhi) as CV Raman fellow. During my stay, I worked with professor Tiwari mainly on passive cooling in building, particularly on green roof as passive cooling technique. Indeed, his experience in the field helped me a lot as a young researcher. Professor Tiwari is simple, open and rigorous in his methods. His teaching on solar energy utilization is a real opportunity for students to understand how solar energy systems work and their applications. Professor Tiwari is also author of many books in the field of renewable energy, particularly in solar energy. These books are useful for several scientists, engineers, students, practitioners in the field and can help competent authorities to take a decision in a context of energy efficiency. Personally, I think that, as a solar energy scientist, professor Tiwari is a great wealth for the scientific community.



Kara, March 26, 2016

Dr. Hodo-Abalo SAMAH
Assistant professor

**Dr. Manoj Kumar Ghosal, Professor,
Orissa University Of Agriculture And Technology,
Bhubaneswar-751003, Odisha.
Email: mkghosal1@rediffmail.com**



***Gone are those memorable and effective days with my teacher Professor G.N.
Tiwari***

It is my great pleasure to avail this opportunity of expressing my feelings and thoughts regarding my revered teacher, Professor Gopal Nath Tiwari under whose guidance and supervision, I got my Ph.D. degree from a prestigious institute like IIT, Delhi. I am fortunate enough to have been closely associated with Prof. Tiwari for 3-4 years while pursuing Ph. D. programme at IIT, Delhi. Today after 12 years when I recall the memories of my interactions with him, those still seem to be very fresh and heart touching. At that time, I was not very much well conversant with colloquial Hindi and when I was telling “mey jaunga”, he immediately started laughing and meant it to be “mey aunga”. Likewise so many interesting and memorable moments had been taken place with him during my stay at IIT, Delhi. I have remembered the day when I met him first time at IIT Delhi after collecting some information regarding his area of research and expertise from one of my friends working in an ICAR institute. The moment I reached IIT, Delhi to meet him, he was not in his room but in the room of Prof. Avinash Chandra. I met him in Prof. Chandra’s room and it was some sort of mini interview for me before both of the professors. Both of them asked so many questions regarding my interest of research, back ground, experience, present position, any exposure to working in the field of solar energy etc. After 15-20 minutes of fruitful discussion, Prof. Tiwari instantly told me that you apply for Ph.D. programme at CES of IIT Delhi and assured 99 percent of your admission under my supervision and 1 percent in the hands of Almighty. I was very much encouraged with his statement and planned accordingly for my admission in Ph. D. programme at IIT, Delhi. But unfortunately, I was not allowed study leave by our University to pursue Ph.D. programme in July session of the year 2000. One of my colleagues in our specialization was allowed study leave and he took admission in Ph.D. programme at RDAT, IIT, Delhi. My colleague after joining as a research scholar there, he was interested to keep Prof. Tiwari as his co-supervisor and tried to bias him like anything against me and convinced Prof. Tiwari that Mr. Ghosal would not be getting study leave within 3 years. But Prof. Tiwari strongly protested in my favour and told him that he had already given word to Mr. Ghosal and if he would not join as a research scholar at IIT, Delhi within a year, then your matter would be

considered. This clearly indicates that he is a man who always sticks to his word and never deviates from his commitment given to anybody in any matter whatever adverse situation may be. If he would have been biased by my colleague, I could have not got a chance to work under such an eminent researcher and renowned academician like Prof. Tiwari. I came to know his excellence and brilliance only after joining the Ph.D. programme at IIT Delhi. I could not forget his constant inspiration and encouragement due to which I could be able to complete my Ph.D work within two and half years and in rest half year I was able to write a book on Renewable Energy with him. It is due to his sincere effort and help, I got my Ph. D. degree as well as publishing a book within 3 years of my study leave. To my credit, I am now the authors of five books one as a co-author with Prof. Tiwari and the rest four have been published solely by me in various publishers of national and international repute.

I had taken up one research work first time in India, particularly in the climatic condition under his active involvement and supervision at IIT, Delhi relating to the use of earth air heat exchanger in greenhouse system. This was most successful and has now been referred and cited by nearly 100 researchers across the globe. He is one of the distinguished researchers and scientists worldwide in the area of solar energy He is extremely a kind and clear hearted person and always tries his best to be of help to the others by any means. Those who have been associated with Prof. Tiwari as students have distinguished themselves in their fields. His students have occupied very key positions as creative physicists and energy scientists all over the world. I can never forget the commanding and impressive speeches delivered by him in any matters of discussion. His good heart, supportive attitude, benevolent feelings and a balanced mind set as an example before all of us. This small piece of my writing about Prof. Tiwari is just a drop of water in ocean. It is my tribute and token of love to Prof. Tiwari who is superannuating on June 30, 2016 after his long and dedicated service in IIT, Delhi

I convey my deepest regards to him through this personal expression. I wish him a very happy, healthy and active life in the years to come and pray before Almighty for his long life.

T. Ghosal

Dr. M. Jamil Ahmad
AMU Aligarh
Ph.D. IIT Delhi (2010)



LONG LIVE MY GREAT GURU JI

No man is born great. Men become great by dint of their hard work, sense of mission and their service to mankind. Professor G.N. Tiwari is such a man. Choosing service over fame and fortune, he spent all his life contributing to nation-building not only through imparting education but also character building, motivation and lending help to the economically oppressed. He is my teacher and a teacher of thousand others who came in contact with him at IIT Delhi for academic excellence and research. Leading a life of promise at IIT Delhi from 1978 to 2016, He has been an exemplary Guru, guide and motivator. His students are spread far and wide all over the globe and I am fortunately one of them working at Aligarh Muslim University as faculty member at Zakir Husain College of Engineering & Technology. I found that he is not only a face in the illustrious faculties at IIT Delhi but also he made his research scholars a face in the crowd by dint of his hard work and extracting maximum output from his students through stimulating input. Leading behind a memorable past, I wish him a healthy and long life.



**Research Assistant,
Ferdowsi University of Mashhad,
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Mashhad, Iran 9173933747**

Greeting **Prof. Dr. G.N. Tiwari**,

From the first days of my education and, in particular, when my dissertation was defined, I became familiar and acquainted with your name and the essence of your research field. The novelty and originality of your work and knowledge in the current scientific world encouraged me to follow you enthusiastically and learn from you more and more. Your research does not only confine to theory, but it also deals with people and their ordinary life. Not only do you push the boundaries of science ahead more than everyone I have known so far, but also you always strive to help people to have a more comfortable life by designing, modeling, and fabricating more efficient solar systems that produce no deleterious substances and compatible to our environment that was gifted from the God. Moreover, so generous are you with your work and knowledge that granted me a chance to be your co-author in a research paper and I was always benefited from your constructive and meticulous suggestions you made.

I wish I'd an opportunity to express my deepest appreciation and gratitude to you in person. However, I am extremely delightful to have this chance to write this appreciation letter to you on the occasion of your retirement. I wish you have a long blissful life with more phenomenal and impressive achievements in future.

Congratulation for your retirement.

Faithfully yours,

Mojtaba Edalatpour

Olivier FISCHER

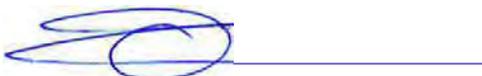


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April 4th, 2016

Pr Tiwari has devoted his time to renewable energies and solar energy utilisation. Concerned by the issues of greenhouse gases emission, he has created and innovated to promote a cost free source of renewable energy, and adapted systems to rural areas. To an extent, he can be considered as a visionary, in regards to his concern for renewable for more than 40 years. He has known how to use his academic skills to create useful systems, and provided scientific tools to understand their behaviour. The ability to combine the academic knowledge to applied solar energy systems is characteristic of his long contribution to the field. These remarkable talents are completed by a capacity to share his knowledge, with teachings and supervisions of many talented students, guided by his vast vision and comprehension of the issues concerned. As a teacher, he adopted a very human point of view, understanding the persons in order to provide them the advices they would need. Making students progress and get a better scientific reasoning is a gift that Pr Tiwari offered us. The challenges that our societies face require persons that care about social, economical and environmental issues. To my point of view, Pr Tiwari represents, by his brilliant studies on renewable energies in rural areas and his work as a teachful professor, a guideline to follow for actual and future generations.

Yours sincerely,



Olivier FISCHER

**Dr Prabhakant
Commissioner of Income Tax
Delhi**



I came to know about Prof Tiwari for the first time in 1989 when I was applying for PhD in IIT Delhi. I had done my M.Tech from centre for Applied Mechanics in Computer Aided Design. My experience in IIT was not good. Anybody who used to appear for Engg Services or Civil Services used to be marked in the deptt. Once marked, life was not easy. Prof. we're antagonistic to such students. As a result the dropout rate was very high. I had also appeared for Engg. as well as civil services while doing M. Tech. As a result, had my own shares of hassles. In this background I was applying for PhD program. I was very clear in my mind. I had to take only one attempt for civil services (I had already appeared for Prilims before applying for PhD). Before joining PhD program I wanted to make it very clear. I did not want the witch-hunt repeated. When I met Prof Tiwari I found him very frank and straight forward. He said I would be free to appear for the Civil Services Exam for the year. However after that if I continue there I must give my 100% to PhD.

With this assurance I joined PhD under Prof Tiwari. From the day one he was very positive and encouraging. As a result I published a research paper in the first 3 months of my joining PhD. Thereafter I took leave to appear for Civil Services Exam . I had already appeared for Engg Services Exam before joining PhD. Result of Engg. Services came after I joined PhD. I was selected and was offered CPWD. I did not join CPWD and sought extension.

As the luck would be, I cleared Civil Services and was asked to join in Sept 1991. I had to leave PhD unfinished. Before leaving I had taken a owe that I would compete my PhD the moment I was posted in Delhi. After training I was posted in Kalkota and then to Ahmedabad. I remained in touch with Prof Tiwari during this period. I was posted to Delhi as Joint Commissioner of Income Tax. The job was very taxing as I was looking after computerization of the entire department. Soon I was posted as Joint Director Enforcement Directorate which was even more taxing.

After joining Enforcement Directorate I met Prof Tiwari and expressed my desire to do PhD. He welcomed me with open hands, knowing it fully well that my job requirements may not allow me to devote as much time for PhD work as expected. After getting his consent I applied for NOC from my department. My Director refused to give me NOC because of my job requirements. He was of the view that it would be impossible for me to spare time for PhD work. I felt very disheartened. Prof Tiwari encouraged me and asked to start research work in spite of the fact that I was not in a position to join PhD officially.

I followed his advice and started work informally under him. Since I was out of touch of the subject, initially it took me time to grasp the subject . Because of Prof. tiwari's encouragement and guidance I slowly gathered confidence and my first research paper was published after 11 months of my joining the research work informally. Thereafter there was no turning back. I published another two research papers all in international journals in the next 12 months.

In the mean time my Director was promoted as secretary to the Govt. of India and a new Director took over. He saw my research papers already published. He then took a decision to allow me to join Phd program at IIT Delhi. As a result when I applied for PhD Program formally in IID Delhi, I had four published research paper to my credit. I formally joined PhD program in IIT Delhi in Dec 2008.

Again because of Prof. Tiwari's guidance I was able to complete my course work, research work both theoretical and practical and presentation of a research paper in International Solar Energy conference Netherlands by March 2011. I was awarded PhD by IIT Delhi in August 2011. IIT does not allow anybody to submit PhD thesis before two years of joining PhD Program. In a way I completed my PhD in two years. All because of Prof. Tiwari's guidance and support.

Sometimes I wonder how someone could retain his pristine fairness and innocence in the ocean of artificiality, backbiting and deceit which many times IIT Delhi appeared to be. Prof Tiwari is a wonderful personality, a very rare species now a days. I always found him positive and always ready discuss a problem without bothering for his own personal commitments. He never took more than a day or two to go through any research paper or problem which I used to submit. I found him working much harder than his research scholars. No wonder he is having maximum number of research papers published by anyone in the country to his credit . He is live example of excellence chased by success.

If I am asked to mention only one quality of Prof Tiwari worth immolating, I would mention his devotion and respect to his GURUJI Prof M.S. Sodha. We had Guru Shishys parampara in this country from time immemorial. However with modern English education this parampara ie tradition is dying a rapid death. Prof. Tiwari is live example of our centuries old Guru Shishya parampara.

To summarize, Prof Tiwari is a very learned, hardworking, knowledgeable teacher at the same time he is a very good friend, an excellent guide, perhaps rarest of rare student (shishya) , is devoted to family values and above all is a very good human being.

I wish him all the best in his post retirement life.

Dr. P. Barnwal
Senior Scientist, Dairy Engineering Division
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It is a matter of immense pleasure and pride to express my thoughts about Professor G. N. Tiwari. He is an eminent personality, teacher and researcher who does not require any introduction in academic field Renewable Energy in general and Solar Energy in particular. He has made great contributions in scientific research and academics which has been well acknowledged worldwide.

I was associated with him during year 2005 to 2008 during my PhD at IIT Delhi. The feeling of being him as a PhD guide gave me a great pleasure. I had an opportunity to work closely with him in organization of 3rd International Conference on Solar Radiation and Day Lighting (SOLARIS 2007) February 7-9, 2007, New Delhi, India. He is a team leader in true sense. He is confident and believes in himself. He is one of the best target masters with strong determination I have come across in my life. He always emphasizes for being well disciplined and punctual to achieve any aim in life. He also stressed to believe in you first and be obedient to elders.

I, along with my family, take this opportunity to pray Almighty to shower in abundance his blessings on him a healthy, happy and peaceful life in coming years.

Dr. Rahul Dev
Assistant Professor
Department of Mechanical Engineering
M.N.N.I.T. Allahabad



First of all, I would like to say that you can never retire as you have wonderful spirit and renewable energy resource from where we can draw enormous amount of energy and encouragement to fulfill our dreams and can work for the betterment of the society.

I have shared various beautiful moments during my M.Tech. as well as Ph.D. thesis work. It was pleasant and knowledgeable trip to City University of Hong Kong, Hong Kong. Then, Because of you, I got a chance to work abroad in Sultan Qaboos University, Muscat, Oman. Thereafter, you have also blessed me for the paper presentation in \hat{A} Yokohama, Japan.

During M.Tech. and Ph.D., I have learnt a lot of things from you directly and indirectly too. I have always watched you 'how you have managed in difficult situation of yours as and other's life'. You have given several task such as "Photovoltaic-thermal Greenhouse Dryer with Dr. Sjuata Nayak Madam", 'Several passive and active solar stills with Dr. V.K. Dwivedi,sir, Dr. Shiv Kumar sir, Dr. Raghvendra Kumar Singh sir ', 'Daylighting with Dr. Vikram Singh sir', and so on.

I remember that during the conference organized at Atrium Hotel (UK collaboration) where you have given a beautiful speech on Rural applications of solar technologies and carbon credit and stopped the mouth of several opponents. I remember that how beautifully \hat{A} you have provided your consultancy in Jaipur Building project and shown a perfectionist approach in sustainable building design. I also remember that whenever I needed your valuable time and suggestions, you were always present there with me.

During SOLARIS-2012, you have also given a full respect to my parents at Sodha BERS Complex, Varanasi. Your design Sodha BERS complex is a excellent utilization of various solar energy concepts and technologies. Sir, because of your blessings and knowledge given to me, I am successfully working as an Assistant Professor at Mechanical Engineering Department, Motilal Nehru National Institute of Technology Allahabad, Allahabad.

Sir, It is not possible to write various moments shared with you. Last, but not the least, I want to say that I am very thankful to you for being your student. Hopefully, we will meet at Balia Conference.

Abhi Bahut kaam karna hai Sir....retirement ki age nahi hai aapki

Dr. Rajesh Kumar
Scientist, Ministry of Science & Technology



My respect to Great Achiever

Its my heart, writing on the wall, being shared with high dignitaries.

In my personal limited understanding Professor Tiwari has recognition as an innovator consistently capable of creating new ideas and solutions to meet the most complex and ambiguous needs and challenges of Science & Technology and its implementation for social change. Quickly crest the learning curve of unfamiliar subject matter and built practice credibility, value, and offerings through creation and promotion of pioneering executive suite ideas, provocative new solutions and methodologies, and groundbreaking intellectual capital that open the doors to new engagements.

Professor Tiwari has always valued internally for commitment and contributions to developing staff; take an active leadership role as a counselor and coach to junior consultants, provide input and guidance on the IIT Delhi for student and staffing process.

His vast research experience of 44 years at different position and institutes, provides a path for the young dynamic student and faculty and research society like to thanks BHU for the training of professor Tiwari for his great work. Professor Tiwari has a long list of publications, out of which some papers are best in their field at international level. The Society has awarded him awards which are best in their field of research and still I presume more are in pipeline for his second inning after retirement while working with NGO, particularly at Varanasi. He has well recognized published books, content of which are simple, informative and problem solving.

I admire his dedication to his mentor Professor M.S. Soda.

Repeatedly, Professor Tiwari recognized as a role model and approachable by student, who requires skill to promote a spirit of teamwork and motivation.

I am impressed with his living style and most focused human being. As a student, he will be my model mentor through out my life and I always see his role in my each and success in professional career.

I wish his all success during his 2nd inning with request to give me chance to be part his team.

Dr. Rajesh Kumar

Scientist, Ministry of Science & Technology



Dr. Rajesh Tripathi
Associate Professor (Physics) & HOD
Applied Sciences and Humanities Department
Galgotias College of Engineering & Technology
Greater Noida, U.P

TO MY DEAREST SIR- WITH LOVE

A 'GOD' in the life of so many students like me- that's how I describe my dearest 'SIR'. He is not only a teacher, a guide, a friend, a father but above all a great human being; who has been continuously and successfully trying to fulfill the aspirations of countless persons through his great knowledge, experience and vision. It is his positive and practical approach to a number of issues that he is excelling in so many fields whether it is of guiding research scholars, writing books, publishing good quality papers or doing work for society and needy people.

He is a 'motivator' and motivates everyone to grow and excel by his visionary approach. He is a 'protector' and protects everyone by giving his valuable suggestions and advice.

And above all, he is a 'creator' and creates a good researcher out of a simple student.

He always takes more pain as a guide than his students. He has always been a supporter of equality and has guided a number of researcher scholars irrespective of religion, caste, Creed and gender.

During the last 18 years, I always had a protective and caring hand of my dearest 'SIR' over my head. As a good pupil I had tried to be a good human being like him. Through this write up I want to assure him that I am always there with him whenever and wherever he wants me.

At the last, I bow my head before him for his innumerable service to the mankind and society.

May God be with him forever so that he can do whatever he wants!



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Dr. RAKHI SHARMA
Associate Professor (Electrical Engineering)

Message

I pay tribute by remembering my guide for directing me towards my goal. I remember all my teachers from School to College the one teacher, who turned out to be my Guru is Prof. G.N. Tiwari, my Ph.D. Guide/adviser in IIT Delhi. He is a renowned expert of Solar Energy. In the early days of my research when I was an immature student sometimes I used to think that he was quite strict towards me, However as a year passed, I realized his effort in helping me prepare the research lessons utilizing my full potential and has shown his confidence in me. His patience is immense; he is an ocean of love and compassion. Whenever I felt low, he inspired me, when things went wrong, he set it right. I recognized two essential traits in my adviser: great inquisitiveness and even greater responsibility. All his actions were selfless. He never expected anything in return. I see just how lucky I was to have him as my adviser.

Another noteworthy aspect of Prof Tiwari is his ability to make each and everyone feel at ease in any context and any situation. He had much to give to everyone. He was ready to share his knowledge without restrictions. Prof. Tiwari has touched the lives of many people, especially his students. He was extremely kind, very generous, the list can be endless. Furthermore, everyone respected him. There is a saying which goes like this "great people live in the minds of others, but good people live in the hearts of others". Guru Prof. G.N. Tiwari belonged to both these categories. He left his imprint in our minds and much more on our hearts. I feel his presence in many ways. Whenever I need him, my Guru is always there. I must say that, I could not have excelled in my field without my Guru's guidance, motivation and confidence in me. Words cannot fill in the gratitude I feel for my wonderful Guru.

My loving '**pranams**' to you 'Guruji'.

(Dr. Rakhi Sharma)

A few words about Professor G.N. Tiwari



Dr. Ravi Gupta

Deputy Director Research (Agricultural Engineering)

Directorate of Research Services

*Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya-Gwalior,
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A Vivekananda wanted to make a fearless society and Sir, is always positive, enthusiastic and fearless. He is a great academician and kind hearted human. What ever I am today is because of him only. I had no recommendation but I was given the institute fellowship by IIT Delhi only because of him. I had many wonderful memories about sir, but I wanted to share one short story. Once as a young research scholar to Prof. M.S.Sodha , he was directed by "Guruji" to search for a physics book among the books placed in the racks. After one hour "Guruji" returned and inquired about the book but even after searching "sir" could not found the book . "Guruji" bent and immediately took out the book paced at the bottom of the rack and remarked sarcastically that perhaps "sir " was not in a habit of bending. Sir quickly replied that his native place was surrounded by all thakurs / Rajpiuts and that may be an "induction effect" because of them only. Guruji must have enjoyed this beautiful academic answer. When sir was telling me this story, he had tears in his eyes that reflects his love , affection and respect for Guruji.

Both me and my wife were research scholars at IIT Delhi. I was allotted married accommodation at top floor of the Nalanda Apartments. Once due to some medical problem I swapped my accommodation with some one at the ground floor. Once I was caught by the caretaker and he blackmailed. I was very tensed, one afternoon I went to his room . He was surrounded by many research scholars, faculty members and students. I told that I wanted to have a private discussion with him. As I was tensed, he immediately requested and all others left the room. I narrated the whole story and he replied " Chauri kiye ho... daka dale ho... ". I said "no". He said " do not worry".

I was doing modelling Fourier Analysis etc. I was not very conversant and was not getting the predicted / logical results. I took 10-15 solved pages to him, within 2 minutes and even less than that he pointed out the mistake in those 10-15 pages full of mathematically equations. I realised that I was only a skilled worker.

Sir do not eat much but he is very fond of small celebrations. Whenever I visited his home it was like I am one of his sons. He will request madam to prepare something special for me.

I was having a brand new "maruti" car and sir use to travel by bus. Once is asked my how I maintain the car. I told him that every month, I fill the tank and used the car till it last and after that I do not use the car. One he took me to Murthal (engineering college), he had some assignment and I too wanted to see that. After finishing the assignment, he got a white envelop as a remuneration. Without opening the envelop he simply gave the whole envelop to me and it was carrying sufficient money for me and my wife to party/long drives.

Once I and sir were returning from IARI to IIT Delhi. We hired a Auto and after reaching IIT the driver demanded 3-4 times more than the meter. I was furious and wanted to fight but sir simply gave the money. I asked him that It was not proper and he should have resisted. He replied that the extra money is for peace of mind and not for the fare. I got the lesson a time we pay extra for peace of mind and not for the services.

There are many more stories. I was one of his most loved research scholars. I may not have earned academic respect as I am not even a fraction of what he is but to my satisfaction I have always earned his purity of attention, love, blessings and affection. For me Sir is my Gurujī.

Dr. Ravi P. Agrahari

Research Scientist, IRD, IIT Delhi



Ever since I met Dr. G.N.Tiwari (Guru Ji) in 2009, I noticed a special attraction and charm in him and with the passage of time when I got to know him better; I realized it was nothing but his positive attitude towards life and capacity to deal with problems.

He is probably the finest person I have ever met and especially when I talk about his dedication towards his work and students whom he always dealt with love and affection.

It is often said that “Everything happens for good” and when i met Guru Ji probably the best happened to me and he took me to the highest peak of success. There can be no end if it comes to describing my father like figure, Guru Ji.

I would just wind up, praying tons of luck for his Great Future and Good health ahead.

Dr. Sanjay Agrawal,

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It was a blessing for me to get an opportunity to work under the dynamic guidance of Prof. G. N. Tiwari. His excellent guidance and advice enlightened my mind to go deep in my research field and found new directions. I will never forget his flexible approach and helpful attitude by making himself available for guiding my research work as per my constraints and convenience. He always knew how to make students work effortlessly. He always respected his student's individualities and enjoyed working with their likes and dislikes. Hence, in return, students loved and respected him. I can never forget those moments how he motivated to attend my first international conference in Sweden. He told me not to worry about the money and transferred Rs 50, 000 in my account without saying anything. He treated me and Dr Rajeev more than his child during entire trip. He is also one of the instrumental who motivated me when I was unable to take decision to Join School of Engineering and Technology, IGNOU. I and my family are highly obliged for his continuous support, affection and sincere advice. I pray and wish with my family that he has a long life with best of his health and keep disseminating the knowledge for generations to come.



Air Commodore (R) Dr. Sanjay Kumar VSM

B.Tech (BITS.R.U.), M.Tech (IIT Delhi), Ph.d (IIT Delhi) FIETE, PGDMM, PGDIM, MBA, MS (Couns & Psychotherapy)

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My Experience with Prof (Dr) GN Tiwari

At the outset, I would like to chant Vandana (Prayer) for my most revered Guru Prof G N Tiwari before I attempt to characterize a person like him and seek his blessings with folded hands.



As far as my experience goes as a Ph D Scholar with him, it has been amazing. He is a man who is blessed with absolute clear vision and hard core professionalism. He is a true scientist, proven academician and seasoned educationist. It is difficult to gauge his level of knowledge and experience. It is perhaps beyond description. He is an expert in the area of harnessing the Solar Power in different forms. The way we cannot measure the full intensity and quantum of Solar intensity, in similar way we cannot measure intensity of his knowledge depth. The most important and priceless quality of Prof GN Tiwari is his humility and soft behaviour with students. He is extremely humble and approachable. He is an asset of the country.

Air Commodore (R)
Dr Sanjay Kumar VSM (Vishist Seva Medal)
VC, ITM University, Raipur
Date : 09 Feb 2016



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Dr S. Irfan Anwar
Principal Scientist & li

No. Per//2016/-01
Dated: March 31, 2016

Experience with Prof. G.N. Tiwari

"Guru Govind dou khare, kake lagun pae; balihari guru apne govind diyo batae"

(True lines for Prof. G.N. Tiwari)

I joined IIT Delhi for Ph.D. programme in 1997 after completing my seven years of service in ICAR system. Before coming for Ph.D., I had only an idea that there is one Prof. G.N. Tiwari in Centre for Energy Studies with many students of ICAR. I could know him better when I joined IIT and started working with him. He always treated me as his colleague and never let me feel the pressure of Ph.D. So is the experience of other students. He is really a very down to earth and simple person. He is very generous and kind hearted who is always ready to share your grief and help you. He has been academically very strong with so many accomplishments. A long list of papers in International and national journals of repute, books written, number of Ph.D. scholars guided and number of projects handled by him are the speaking facts about Prof. Tiwari's calibre and strength. Association with Prof. Tiwari is one of the best experiences of my academic career and the time spent at IIT Delhi will always be in my sweet memories. After retirement also, he is ready to serve the science and the mankind as he has established Bag Energy Research Society (BERS) at Varanasi and this is an eye opener for those who think that retirement is the end of road. This gives us inspiration to follow his footsteps and I would be happy to associate with his mission.

It is my proud privilege that being student of Prof. Tiwari I am linked with Prof. M.S. Sodha, a legend in solar energy, also as prof. Sodha was my Ph.D. examiner. Prof. Sodha is Prof. Tiwari's *Guruji* and I have not seen such a respect and affection one has for his teacher. This is a living example of *Shishya-Guru* relationship and we all should learn this lesson from him.

I am proud to be a student of Prof. G.N. Tiwari.



31/3/16
(S.I. Anwar)

Dr. Shiv Kumar Dubey
Dy. Director
(Department of Training and Technical Education Delhi)
E-mail: skdubey_1966@rediffmail.com



It is a great privilege and honour for me to express my thoughts about my Guru ji (i.e. Prof. G.N. Tiwari). I joined IIT Delhi in the year 2005 as a research scholar under his supervision and found him much interacted, who influenced me a lot with his simplicity, wide knowledge and his motivate behavior towards the scholars and others. He is kind, considerate, well organized individual, a self respecting man with lot of respect for other people, an articulate speaker, an intelligent man with lot of integrity, a trust worthy human being, an efficient and perfect guide who knows himself and his work well.

Guru ji has invaluable pioneering contributions in the diversified areas of science, engineering and technology for the welfare of our country. He has written many books and papers, contains his scientific contributions in the field of solar energy with that scientific and rural community have been benefited worldwide. India is proud to have such a distinguished personality who has pioneered research in the field of solar energy applications.

Prof. Tiwari ji has many remarkable qualities to his credit. He is very honest besides being very simple, religious and very down-to-earth. He is also helping the rural community through NGO (i.e. BERS) and regards all regions equally. He is a true devotee of Prof. M S Sodha (Guru ji) and I wish him the best of health and all the happiness in years to come. In fact there are no words in the dictionary to comment on such a great personality and express about. Wish I could inculcate in me his sensitivity for human feelings, his untiring faith in human goodness and his transparent sincerity.

Dr. Shyam N. Bajpai

Retired: Senior Engineer and Project Manager/US Dept. of Commerce
National Oceanic and Atmospheric Administration (NOAA)
National Environmental/Weather Satellites Systems Development

Formerly:

Prof. Electrical Engineering, State University of New York Stony Brook.
Senior Engineer, Westinghouse Research and Development Center, PA.

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Memories of My Association with Prof. G. N. Tiwari

My association with Prof. G. N Tiwari goes back almost 39 years. In 1977, I joined IIT/D as a Ph.D student in February; Dr. Tiwari joined as PDF in August and started working on new projects of solar energy studies. During my stay 1977-1980, I have seen him working very hard with long hours on all seven days, on the beginning projects that became foundation of CES today. Dr. Tiwari made pioneering contribution to solar area at IITD. I consider him as one of the pillars of CES.

I never worked in the area of Energy. My Ph.D. thesis was on microwave excitation and propagation; later extended to Optical and applications to communications and Weather Satellite Systems and how the sensors contribute to severe weather forecast. But I can say that Dr. Tiwari put seeds of his incredible and hard work to solar energy program 39 years ago that became CES now. Only few of us who were there that time can appreciate that.

After I left India in 1981, so our interaction became very limited. He attended a conference in Canada in 1984 or so and visited us when I was at State University of NY at Stony Brook.

Then, in January 1996, Prof. Tiwari came to see me at the home of Dr J. K Sharma, formerly at CES, and accompanied us to Delhi Airport to see me off, for my flight back to Washington DC.

In September 2015, we had wonderful meeting with Prof. Tiwari and his group in Washington DC at our common friend Dr Alok Srivasatava' home. It was after 20 years. He shared briefly his long list of accomplishments that have made a difference in the area on Solar Energy.

I shared also that I took retirement on January 31, 2014 to pursue my interests for the rest of my life: (1) to understand and experience spirituality with modern science and technology, yoga, meditation, physical activities, (2) help our children and grandchildren, (3) Selected travel and (4) volunteer community service.

My wife Mira and I offer congratulations to Professor Tiwari on the occasion of his happy retirement from IIT and send our best wishes to the Tiwari family, as they start new phase of life with new adventures. Mira still remembers Dr Tiwari working outside the main building, on Sundays/ late evenings, while we were taking walk on IIT lawns.

Dr. Sujata Nayak
Associate Professor
Mechanical Engg. Department
Manav Rachna University,
Faridabad, Haryana



“Better than a 100 days of diligent study is one day with a great teacher” – Japanese proverb

It has indeed been a great honour and pride to have had the opportunity to be a student of Prof. G. N. Tiwari as apart from his immense academic stature, he has been a huge inspiration and genuine mentor to all his students as well as colleagues. Prof. Tiwari is a rare example of a brilliant academician having an extremely warm and personal connect with his students in the true “guru – shishyaparampara”. A true “karmayogi”, he has always considered his students and colleagues and part of his extended family and it is his this caring attitude that has endeared him to one and all over his long and illustrious career at CES, IIT Delhi. Prof. Tiwari has shown how to conduct oneself with humility and simplicity and has been a source of continuous encouragement and guidance even long after one has completed his / her academic pursuits under his able guidance.

Prof. G. N. Tiwari’s contribution to the field of renewable energy research in India has been immense. He was instrumental in setting up the Centre of Energy Studies at IIT Delhi in 1976, which has been conducting cutting edge research especially in the field of solar energy over the last 40 years. It is important to note that most of the research work conducted at the centre has many practical applications especially in rural / semi - rural parts of the country which is where the benefits of technological research is most required. It is with this passion and dedication to his area of research that Prof. Tiwari set up the “Bag Energy Research Society – BERS” which works towards developing practical scientific solutions for everyday applications amongst the rural households of the country.

I have had the unforgettable experience of participating in some of the international and national conferences as well as seminars conducted by Prof. Tiwari, each of which has been extremely enriching and rewarding for a student in this field. International as well as national scientists of repute have acknowledged his contribution in the field of renewable energy. He has over 550 publications in various international and national journals of repute, each of which have been quoted by research students in various universities and institutes of repute across the globe. Prof. Tiwari has also authored 20 books on solar energy which have been well accepted by students and faculty. Being a guide to over 75 PhD students, in his long and illustrious career, Prof. Tiwari is indeed a leading light in the area of renewable energy. He has won many national and international awards such as Hari Om Prerit S. S. Bhatnagar award and Vigyan Ratna Award.

I join my fellow students to wish Prof. Tiwari and his family a happy & contented future ahead and look forward to his continued guidance and blessings.

A few words about Professor G.N. Tiwari



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A teacher is a compass that activates the magnets of curiosity, knowledge, and wisdom in the pupils - Ever Garrison.

When I read such quotes, I remember about Prof Tiwari. It is a great privilege and honour for me to express my thoughts about Professor G.N Tiwari. First time I met him during student's orientation day at CES, IIT Delhi and he left an eternal impression in my mind. During my master's degree, I studied a course on 'Solar Energy and its Application' by Prof Tiwari. This course has developed lots of interest on use of solar power and then I decided to pursue my career in the same field. Prof Tiwari supervised me during my post-grad project and PhD degree. His guidance, inspiration, academic feedback, and moral support helped me a lot to achieve my career goals.

I also got an opportunity to work with him on a social cause and building the foundation for a NGO 'BAG Energy Research Society', to contribute towards sustainable development, clean environment, and improve living conditions using renewable energy technologies.

Prof Tiwari has incessant list of academic excellence and achievements, like, more than 500 research publications and many reviews published in leading national and international journals, guiding more than 65 PhDs thesis and authoring over 20 books themselves tells the story. Prof Tiwari has been recognized at both national and international levels. He was a co-recipient of the 'Hariom Ashram Prerit S.S. Bhatnagar' Award and conferred as 'Vigyan Ratna' by the government of UP, India. Prof Tiwari has developed one-of-its-kind research facility as a 'Solar Energy Park' at IIT Delhi.

Prof Tiwari has made outstanding contributions in the areas of solar thermal, photovoltaics, solar distillation, water/air heating systems, greenhouse technologies, Earth to air heat exchangers, passive building and hybrid photovoltaic thermal systems, climate change, energy security, etc.

Prof Tiwari is a great academician and scientist. Apart from his Excellence in the field of Science and Technology he is a very kind hearted, humble and encouraging person. I consider myself very fortunate and privileged to have Prof Tiwari as my teacher/guide/mentor. Whatever I am today, it is because of him only. I am extremely grateful to Prof Tiwari. I like him from the core of my heart. I pray to almighty for his healthy and long life ahead.

Submitting with Best Wishes and kind regards,

Dr Swapnil DUBEY



6 January 2016

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To whom it may concern:

Professor G N Tiwari – Energy Education Pioneer of India

I have known Professor Tiwari for almost 15 years through his very many quality publications, his mentoring of doctoral candidates, his super organisation skills related to scientific conferences but above all as a wonderful host and friend. I have been deeply impressed by Professor Tiwari's love for fellow humans and his respect of his past teachers, a quality that is becoming quite rare in modern times. On this occasion I would like to share a relevant story with fellow colleagues.

The great Persian poet, Sheikh Saadi is famous for the many tales that contain memorable lessons. On one occasion, when he was much younger and was attending school he would suddenly stand up from a sitting cross-legged posture. Someone enquired the reason for that odd behaviour. He narrated thus: 'Our class room is at one end of a small lane. At the other end of the lane the young son of my teacher is playing with a ball. Each time he approached the class room I get up out of respect to him'.

The above story shows the great respect that is extended to any teacher in the Eastern culture. Professor Tiwari is another example of such commendable devotion that he has shown to his teacher Professor Sodha by organising many events as a mark of respect and honour.

I consider myself lucky to have known Professor Tiwari and look forward to working with him in the future for the development of his brainchild – the Energy Academy.

Professor Tariq Muneer, PhD, DSc, CEng, FCIBSE, Millennium Fellow
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Visiting Professor: Civil Engineering Department, University of Granada - Spain (2013-2020)

Visiting Professor: Faculty of Logistics, University of Maribor – Slovenia (2013-2020)

5 March 2016

Dear Sirs,

Re: Prof. G.N. Tiwari

It is indeed my honor to have the opportunity to write about Prof. G.N. Tiwari.

As an influencing and productive scholar in the field of thermal engineering and renewable energy, Prof. Tiwari has been a well-known figure to me for many years. But it was not until February 2007 that we first met in IIT Delhi, for his hosting the SOLARIS conference. Being staying at the Guest House on campus we had breakfast together almost every day during the period. Since then I met Prof. Tiwari on various occasions, including once in Lyon France when we both served as external examiner for a PhD candidate from the National Institute for Applied Science of Lyon. Prof. Tiwari has been for years serving the editor role in many leading academic journals. Despite of his worldwide reputation, this frequent prize winner is always flexible and considerate, not even insisting on vegetarian restaurant when only two of us were staying behind for dinner.

As the conference organizer of SOLARIS 2007, Prof. Tiwari was no doubt an excellent leader with good vision and devotion. The scholarly book exhibition and outdoor conference dinner were so special that made the event remarkable and distinguishable from any other international conferences I experienced before. So was SOLARIS 2012 and when was my first visit to Varanasi, and taking part in the inauguration ceremony of the Bag Energy Research Society Complex. This low carbon building set a good example how active and passive solar technologies can be well integrated with energy efficient services systems, and thoughtfully made full use of the natural resources. I was also impressed by his many research students who were trained to be humble, sincere and productive.

May I take this opportunity to wish Prof. Tiwari be always in good health, and be enjoyable in whatever role he would like to play in the coming years.



Yours sincerely,



Tin-Tai Chow
City University of Hong Kong

Dr. Vijay Kumar Dwivedi
Galgotia University

Dedicated to my Guruji (Prof. G.N.Tiwari)



Before I start writing about my Guruji I will Say

Sat-Sat Pranam to Guruji

I think I have certainly done some good work in my life that I got Prof. G.N.Tiwari as my Guru and mentor. After my master from MNREC Allhabad I have decided not to pursue for further higher education because of lots of mental trauma I faced during my PG course. But I am fortunate that in 2004 I met Dr A.K.Rai (A through gentle man) who told me about Guruji and his qualities. My heart told me that Prof. Tiwari is the only person who can guide me successfully for my Ph.D work which was necessary for my teaching carrier.

Then, I met Guruji in IIT Delhi in February 2004. From my first meeting I felt that he is the right person to become my Guru. After that I start meeting guruji. Very soon I got admission in Ph.D because of his blessing and good wishes.

I had heard that Ph.D scholars usually take six month to one year in finalizing his research topic (literature survey) but our Guruji is so learned that he finalizes topics within an hour which shows about his knowledge in the area of solar Energy and its application. I had never thought that I will complete my Ph.D work so smoothly. Sir all credit goes to you and my father for my successful life. Under your guidance I learnt a lot and because of that I achieved everything required for a good life.

I am not the right person to discuss about guruji contribution in the area of his academic contribution in the field of Renewable Energy in general and SOLAR ENERGY in particular but I feel that he is the most knowledgeable person in the area of his interest which can be proved by his research papers/book authored/research scholar guided/ expert lecture delivered in India and abroad.

His respect towards his guru Prof. M.S.Sodha is unparallel and is a yardstick to meet that for all pupils of the world.

Sir, my feeling towards you is that u are

The best son

The best Shishya

The best Guru

You are my role model and one thing is clear that I will always be with you with my full capacity. I will never commit any mistake which will hurt you and will be available as and when required by you.

Sir, Again

Sadar Pranam

Sir, I pray God for your long and healthy life



Italian National Agency for New Technologies, Energy and Sustainable Economic Development

January 21, 2016
Dr. Vinod Kumar Sharma
Senior Scientist

TO WHOM IT MAY CONCERN

The undersigned Dr. Vinod Kumar Sharma, Senior Scientist from the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) certainly feel honoured to say a few words about a well-qualified, hardworking individual and great human-being, Prof. G.N. Tiwari, whom I've the pleasure to know for more than thirty-five years or so.

It gives me a great pleasure to inform you that Prof. G. N. Tiwari is a highly professional and his knowledge on various aspects of energy and environment, higher education and energy policy, is quite deep.

As a scientist, with more than 35 years of working experience in different R&D institutions of prestige, especially, EURATOM, ENEA, ICTP, UNESCO, UNIDO, ESTIF, etc. and, moreover, actively involved in the scientific collaboration programme between India and Italy, I am happy to admit that I've the pleasure to interact continuously with Prof. G.N. Tiwari and his colleagues from IITD and needless to say that I am very much impressed by his cooperative nature and working skill even under difficult and tense atmosphere.

Prof. G.N. Tiwari is a class of himself, he has an innovative mind that is capable of analyzing and solving problems in a simple but efficient and effective way.

I am more than convinced that Prof. G.N. Tiwari would certainly be an excellent asset to Energy Education through Bag Energy Research Society (BERS).

I wish him all the best in his future undertakings.



(DR. V.K. SHARMA)

(Dr. Vinod Kumar SHARMA)
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Lakhmi Chand

Jr. Technical Superintendent

Center for Energy Studies (CES),

Indian Institute of Technology (IIT), Delhi

यह मेरे लिए बड़े वर्ष की बात है कि सर ने मुझे अपने विचार रखने का मौका दिया। मैं प्रो. जी. एन. तिवारी जी को सन 1996 से जानता हूँ। और 1996 से तिवारी जी के साथ काम कर रहा हूँ। अपने जीवन के इन 20 साल में हमेशा तिवारी जी के हंसमुख व्यक्तित्व को देखा है। और तिवारी जी के साथ रहकर जीवन के हर पहलू (चाहे वो परसनल लाइफ हो या प्रोफेशनल लाइफ का हो) को बहुत कुछ सीखा है। उनके साथ बिताये हुए सुनहरे पलों की याद हमेशा मेरे हृदय में बनी रहेगी। इनका व्यवहार सभी के प्रति बहुत ज्यादा पाजिटीव और यथा पूर्ण है। इनके हृदय में हमेशा दूसरों के प्रति सम्मान, ईमानदारी, क्षमाशीलता, तथा कर्तव्यनिष्ठा की भावना कूट-कूट कर भरी हुई है। इनका ऐसा व्यक्तित्व है जो सभी को एक समान समझ कर, पूरी टीम को एक साथ लेकर बिना भेद-भाव के सभी की मदद करना सभी के हृदय को छू जाता है। ये दूसरों के दुख को देखकर बहुत इमोशनल हो जाते हैं। कभी-कभी तो विलाप भी कर देते हैं। इसी करुणासयी भावना के कारण कुछ व्यक्तियों के द्वारा इनके सामने घड़ीयली आँसू बहाकर इनसे काफी क्रोध प्राप्त भी किया है। और बाद में जब मतलब निकल गया तो इनके प्रति अपना व्यवहार भी बदल दिया। लेकिन इन्होंने अपनी क्षमाशीलता प्रवृत्ति के कारण फिर भी उन्हें क्षमा ही कर दिया। इन बीस सालों में मुझसे अंतजाने में गलतियाँ भी हुई होंगी लेकिन सर ने मुझे कभी भी इसका अहसास नहीं होने दिया। प्रो. जी. एन. तिवारी ऐसे व्यक्ति हैं कि योग्यता को देश के सर्वोच्च को सुरोभित करने की हैं। तथा इच्छा क्रोध भी माँगने की नहीं है। इनका व्यक्तित्व सादा जीवन उच्च विचार की भावना को स्वतः ही प्रदर्शित करता है। मैं आने वाले समय में इनके लिए शारीरिक, मानसिक और आर्थिक सम्पत्ता के लिए भगवान से हृदय से प्रार्थना करता हूँ।

5.

List of

PhD Students

5.1 Completed PhD Students

S. No.	Name of Student (Year of Award)	Thesis Title
1.	A. Kumar (1981)	Physics of Solar Still
2.	U. Singh (1982)	Analysis of Some Solar Passives Concept
3.	M. S. Hussein (1982)	Thermal Modeling of Some Solar Water Heater
4.	N. K. Dhiman (1982)	Analysis of Some Solar Collector-cum-Storage WH
5.	S. N. Rai (1985)	Modeling of Solar Thermal Devices
6.	S. N. Shukla (1985)	Thermal Modeling of Solar Hot Water System
7.	B. Rao (1986)	Parametric Studies on Improved Solar Distillation
8.	Madhuri (1986)	Some Studies on Solar Distillation and WHS
9.	Y.P.Yadav (1987)	Design and Fabrication of Solar Distillation System
10.	D.K.Dutta (1988)	Thermal Analysis of Solar Thermal Energy Devices
11.	A.Kumar (1989)	Analytic Performance Studies on Various -Solar Distillers
12.	A.K.Singh (1993)	Computer Modeling of Advanced Solar Distillation
13.	S. Sinha (1993)	Computer Modeling of and Techno-economic Analysis of Solar Water Heating and Active Distillation System
14.	S. B. Sharma (1993)	Long Term Performance of Large Scale Solar Hot Water
15.	M. Upadhyay (1993)	Study of Thermal Performance of Solar Architecture
16.	S. Kumar (1993)	Thermal Evaluation of Thermal Comfort in SH
17.	S. A. Lawrence (1993)	Performance Studies of Different design of Solar Still and its Applications in PNG
18.	K. Thakur (1994)	Theoretical Evaluation of Solar Thermal Appliances
19.	N. Lugani (1995)	Performance Evaluation of Building by using Passive Heating
20.	R. F. Sutar (1995)	Computer Modeling of Controlled Environment GH
21.	B. Prasad (1995)	Performance Studies of Solar Distillation Systems
22.	S. K. Singh (1996)	Thermal Evaluation of Integrated ASS
23.	S. Kumar (1996)	Computer Based Analysis of HMT in Solar Distillation System and its Experimental Validation
24.	Emran Khan (1996)	Basic Parametric Studies of Solar Distillation
25.	P. Saxena (1996)	Thermal Modeling and Applications of Distillation Systems

26.	C. Sumedha (1996)	Thermal Analysis of Passive Solar Systems
27.	S. Suneja (1997)	Computer Modeling of an Inverted Solar Distillation System
28.	R. K. Goyal (1997)	Computer based Thermal Modeling of Solar Crop Drying System
29.	P. K. Sharma (1998)	Computer Modeling and experimental testing of Greenhouse
30.	J. A. Usmani (1998)	Thermal modeling, performance evaluation of biogas System
31.	S. Kumar (1998)	Study of Heat and Mass Transfer in Solar Distillation
32.	S. Aggarwal (1999)	Computer based Thermal Modeling of Advance Solar Distillation
33.	Irfan Anwar (2001)	Thermal Modeling for heat and Mass Transfer and Solar crop Drying
34.	R. D. Singh (2001)	Thermal Modeling of Green House for off-season crop Production
35.	M. Din (2003)	Performance Evaluation of a Passive Greenhouse
36.	D. Jain (2003)	Application of Greenhouse for Crop Production and Drying
37.	A. Gupta (2003)	Evaluation and Application of Solar Fraction for a Greenhouse
38.	M. K. Ghosal (2003)	Thermal Modeling of a greenhouse and Its Experimental Validation
39.	H. N. Singh (2004)	Evaluation of Solar Radiation for different Indian Climate and its Application for Distillation
40.	Ravi Gupta (2004)	Thermal Modeling of a Greenhouse using the Concept of Solar Fraction
41.	Om Prakash (2004)	Heat and Mass Transfer for Production of Jaggery (GUR)
42.	Rajesh Tripathi (2005)	Performance of Passive and Active Solar Distillation Systems
43.	Islam Nawaz (2006)	Effect of Use of Renewable Energy Sources to Keep Environment for New Millennium
44.	A. K. Tiwari (2006)	Annual Performance of Solar Still for different Inclinations of Condensing covers and water depths
45.	Bikash Sarkar (2006)	Performance Evaluation of Aquaculture cum Greenhouse
46.	Ashish Shukla (2006)	Heating/Cooling Potential of Passive Techniques
47.	Anil Kumar (2006)	Thermal Modeling of Greenhouse Dryer

48.	Nisha Kumari (2006)	Computer Modeling of Various Heating Concepts of GH
49.	Anand Joshi (2006)	Evaluation of Cloudiness/Haziness Factor and its Application for PV/T System for Indian Climatic Conditions
50.	Tribeni Das (2007)	Performance Evaluation of Greenhouse for Acquaculture and Fish Drying
51.	Vimal Dimri (2007)	Energy and Exergy analysis of a Passive and Active Solar Distillation Systems
52.	Mansoor SDA (2007)	Study and Analysis of Greenhouse-Thermal Modeling
53.	Shiv Kumar (2008)	Performance analysis of hybrid photovoltaic/thermal (PV/T) active solar distillation system
54.	V.K. Dwivedi (2008)	Performance study of various designs of solar still
55.	Swapnil Dubey (2009)	Performance evaluation hybrid photovoltaic/thermal (PV/T) water heating system
56.	Vivek Raman (2009)	Energy, exergy and life cycle cost analysis of hybrid photovoltaic air collectors
57.	G.S.Sandhu (2009)	Hybrid photovoltaic/thermal water heating system
58.	SujataNayak (2009)	Performance evaluation of an integrated hybrid photovoltaic- thermal(PV/T) and earth-air heat exchanger greenhouse system
59.	Jamil Ahmed (2009)	Performance evaluation of various models for solar radiation, day lighting and its applications
60.	M. K. Gaur (2010)	Development of heat and mass transfer coefficient/correlations for high performance solar distillation systems
61.	Prabhkant (2011)	Effect of carbon credits on economics of renewable energy systems
62.	A. Chel (2012)	Thermal performance and economic analysis of mudhouse integrated with stand alone photovoltaic, earth-air-heat exchanger and daylight
63.	Rahul Dev (2012)	Thermal modeling and characteristic equations for passive and active solar still
64.	G. Singh (2012)	Long term performance of hybrid photovoltaic thermal systems
65.	D. Kamthania (2012)	Performance evaluation of PVT air collectors: ANN approach
66.	Rakhi Sharma (2012)	Energy matrices for SAPVT systems
67.	Kanchan Vats (2012)	Performance evaluation of BiPVT systems

68.	Ajit Kumar (2012)	Drying of medicinal/vegetables products by PVT greenhouse dryer
69.	G. K. Singh (2012)	Analysis of environmental impacts on the performance of PV modules
70.	A. K. Singh (2012)	Performance evaluation of mixed mode and greenhouse PVT dryer
71.	Raghwendra Singh (2013)	Energy and exergy analysis of passive/active solar still
72.	R. K. Mishra (2013)	Performance evaluation of hybrid PVT systems
73.	C. Rajoria (2013)	Performance evaluation of PVT air collectors and its applications
74.	Ankita Gaur (2014)	Performance evaluation of different material of solar cells and its applications
75.	Ravi P. Agrahari (2014)	Performance analysis of biogas production and utilization under different parameters
76.	Vikram Singh (2015)	Design and life cycle energy analysis of a passive building: SODHA BERS COMPLEX
77.	D.B. Singh (2016)	Exergoeconomic and Enviroeconomic Analysis of Active Solar Stills: A Comparative Study
78.	J.K. Yadav (2016)	Energy and exergy analysis of active photovoltaic thermal (PVT) solar distillation system
79.	Vihang Garg (2016)	Performance evaluation of N-series connected evacuated tubular water collectors

5.2 Ongoing PhD Students

S. No.	Name of Student (Year of Registration)	Thesis Title (Tentative)
1.	Jasleen Bhatti (2011)	Performance of passive and active greenhouse
2.	Madhu Sudan (2011)	Evaluation of day lighting in SODHA BERS COMPLEX
3.	Vivek Tomar (2012)	Building Integrated Photovoltaic (BIPV) System at SBC, Varanasi
4.	Rashmi (2012)	Application of PVT Air Collector
5.	Shyam (2012)	Exergoeconomic and enviroeconomic analysis of photovoltaic thermal (PVT) water and air collectors connected in series
6.	Poonam Joshi (2012)	Energy and Exergy analysis of hybrid active solar still

7.	Lovedeep Sahota (2012)	Energy and Exergy analysis of passive and active solar distillation systems
8.	Sunil Kumar (2012)	Study of hybrid energy systems
9.	Neha Gupta (2012)	Periodic theory of passive heating and cooling system of buildings
10.	Arjun Deo (2013)	Design and performance evaluation of micro-wind turbine coupled with BiPVT systems
11.	Firehun Taffesse Feleke (2013)	Periodic analysis of photovoltaic thermal (PVT) passive solar building
12.	Deepali Atheaya (2013)	Performance evaluation of partially covered photovoltaic thermal compound parabolic concentrator (PVT-CPC)
13.	Rohit Tripathi (2013)	Energy and exergy analysis of of N-Photovoltaic thermal compound parabolic concentrator (N-PVT-CPC)
14.	Vidya Sagar Gupta (2013)	Performance of standalone PV system
15.	Pramod Rajput (2013)	Effect of degradation of PV module on PVT system
16.	Sumit Tiwari (2013)	Thermal modeling of PVT dryer: A heat and mass transfer approach
17.	Heena Fatima Ali (2014)	Performance of a building integrated PV system.
18.	Gourav Kumar Mishra (2014)	Performance of a building integrated PVT system
19.	Sugandha Singh (2014)	Energy matrices of PVT systems
20.	Neha Dimri (2015)	ANN modelling of PVT systems
21.	Hoor Fatima Ali (2015)	ANN modelling of partially covered photovoltaic thermal compound parabolic concentrator (PVT-CPC)

6.
Family
of
Prof. G. N. Tiwari



Dear Daddy

You r the bst teacher in this whole world. because you teach every d acadmical and personally. You always teach us your personal experiences which helps us alot for making right direction.

You my bst teacher because my school teacher's stays with me only for 6hr and for 12yrs. But you stay with me at the end my career. They only teach us the symbols things or study bt you teach me how to a good child as well good human being.

I want to be your bst child and student. you ever had.

Love you daddy
u
I always need your
blessings.




Love is passed
And love is received
To be passed on again:
A precious heirloom
Twice, twice blessed
A spiritual covenant.

I'll put it on
And treasure it
The me I have received.
And when the roles
Reverse again,
I'll have what I most need.

So may our love
Go on and on.
A hundred thousand years
Fathers and daughters
Daughters and fathers
Through joys and
other: tears.....!!!

HAPPY FATHER'S DAY

Father and daughter
daughter and father,
Both are meant for each other
There is nobody in this world
who loves a girl more than her dad...
And I think I am one of them
Every father shows there love in
different way - but you never show
you always realise with your anger attitude.
which sometimes hurts, but when we think and
I feel guilty...
I am sorry daddy for all what I have done
My purpose was not to hurt you
I promise
I'll reach the height of excess where you
want to see me...

LOVE U ALWAYS!!
WITH U ALWAYS!!!
NEED U ALWAYS!!!

– Feelings of Gopika Tiwari



