

Interview

BIOTECH PRESS

Prof. Ashok Pandey

Chief Scientist, CSIR- NIIST
Head, Centre for Biofuels &
Biotechnology Division, CSIR- NIIST

**SCIENCE AND
RELIGIOUS
MYTHS- CAN
THEY COEXIST?**

**NEW TOOL TO
GET MEANINGFUL
INFORMATION
OUT OF BIG DATA**

**EXTRA BRAIN
CELLS MAKE
MALES
REMEMBER
SEX**

**DNA LESS
GENOME
EDITED
PLANTS**

**NEW
CLASS OF
DNA
REPAIR
ENZYME**

**NEW GENUS AND
SPECIES OF EXTINCT
HOMINOID,
PLIOBATES
*CATALONIAE***

**NHBT
2015**



ORGANIZERS



Prof. Ashok Pandey

DPHil, FBRS, FNASc, FIOBB, FIEES, FAMI

Chief Scientist, CSIR- NIIST

Head, Centre for Biofuels & Biotechnology Division

National Institute for Interdisciplinary Science and Technology

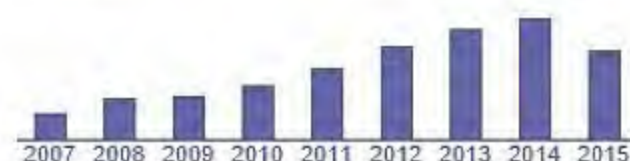
Interview

Professor Pandey's research interests are on bio-based economy development, involving microbial & enzyme technology, and food & fermentation technology for the production of fuels and chemicals. He has >1050 publications/communications, which include 14 patents & design copyright, 38 books, 111 book chapters, 410 original and review papers, etc with h index of 70 and >21,000 citation (Google scholar).

In this issue we are presenting here the humblest, helpful person who despite of his high position is always ready to help others. I personally know this because he gave BEM enormous encouragement to promote education and business of Biotechnology and indeed BEM is Official Media Partner of NHBT 2015 organized by CSIR- NIIST and BRSI.

Ashok Pandey

Citation indices	All	Since 2010
Citations	21186	14865
h-index	70	56
i10-index	257	228



Academic Qualification

B. Sc. 1974	Biology, Chemistry	Kanpur University
M. Sc. 1976	Chemistry	Kanpur University
Ph. D. 1979	Microbiology	Allahabad University

Professional Experience

1979-82	Post-doctoral Fellow, Allahabad University
1982-85	Scientist, National Sugar Institute, Kanpur
1985-86	Scientist, Biotechnology, Zentral Laboratorium, Sudzucker, Germany
1987-till-date*	Scientist, National Institute for Interdisciplinary S&T, CSIR, Trivandrum

Visiting Scientist: Germany, Italy, France, Greece, UK, Argentina, Brazil, Malaysia, Thailand, Ireland, Hungary, Australia, USA, Mexico, Korea, Japan, Switzerland, Singapore, Taiwan, Hong Kong, China and Sweden



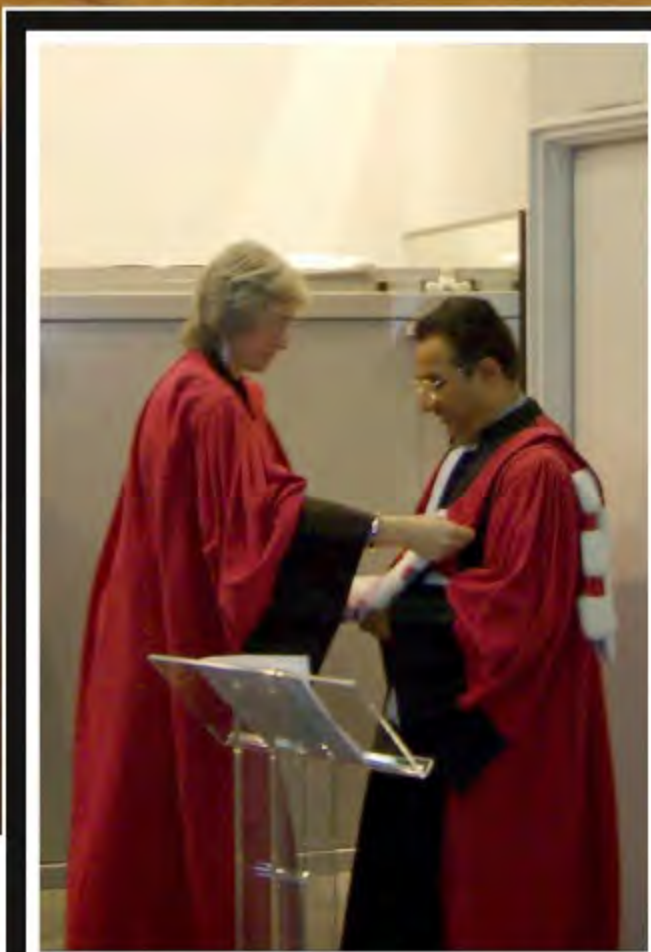
Dr Pandey with Teambiotech scientists in CSIR-NIIST

Professor Pandey is the recipient of many national and international awards and fellowships, which include Fellow of International Society for Energy, Environment and Sustainability, National Academy of Science (India), Biotech Research Society, India, International Organization of Biotechnology and Bioengineering, and Association of Microbiologists of India; Honorary Doctorate degree from Univesite Blaise Pascal, France; Thomson Scientific India Citation Laureate Award, USA; Lupin Visiting Fellowship, Visiting Professor in the University Blaise Pascal, France, Federal University of Parana, Brazil and EPFL, Switzerland; Best Scientific Work Achievement award, Govt of Cuba; UNESCO Professor; Raman Research Fellowship Award,

CSIR; GBF, Germany and CNRS, France Fellowship; Young Scientist Award, etc. He was Chairman of the International Society of Food, Agriculture and Environment, Finland ((Food & Health) during 2003-2004. He is Founder President of the Biotech Research Society, India (www.brsi.in); International Coordinator & General Secretary of International Forum on Industrial Bioprocesses, France (www.ifbiop.org) and Vice-President of the International Society for Energy, Environment & Sustainability (www.isees.org) and All India Biotech Association (www.aibaonline.com). Prof Pandey is Editor-in-chief of Bioresource Technology, Honorary Executive Advisors of Journal of Water Sustainability and Journal of Energy and Environmental Sustainability and editorial board member of several international and Indian journals.

Sir can you tell us about your personal and educational background? And also the motivation factor to pursue research and academic career.

I am born and brought up in Kanpur (UP); my father was a teacher. Even at stage of my schooling, I had desire to adopt research as my profession. Over the period, this desire grew like a strong will and then became a passion. I was much influenced by the scientists, in particular inorganic chemists such as Robinson and several microbiologists, including great ones like Louis Pasteur.



Dr Pandey receiving Honorary Doctorate degree from the President Univesite Blaise Pascal, France in 2007

Contribution in Scientific Writing

Editor: Bioresource Technology- Elsevier, UK (2004-cont)

Editor-in-chief: Bioresource Technology- Elsevier, UK (2011-cont)

Executive Editor: Bioresource Technology, Elsevier, UK (2010-cont)

Honorary Executive Advisor: Journal of Water Sustainability, Australia (2013-cont)

Honorary Executive Advisor: Journal of Energy and Environmental Water Sustainability (2014-cont)

Editor: Elsevier book series of six volumes of biomass, biofuels & biorefinerie (2013-2015)

Editor-in-chief: Current Developments in Biotechnology and Bioengineering (Elsevier book series of nine volumes- 2014-15)



Ashok Pandey

Head, Centre for Biofuels & Biotech Div, CSIR-Natl Institute for Interdisciplinary Science and

Bioprocesses and Products Development, Biofuels, Industrial Enzymes, Biopolymers, Organic Acids

Verified email at niist.res.in



Editorial Board Member

CURRENTLY

International: Iranica Journal of Energy & Environment, 2014-cont), Biofuels Research Journal, 2014-cont

Journal of Environmental Science and Sustainability, 2012-cont, TheScientificWorldJOURNAL, 2011-cont

Journal of Waste Conversion, Bioproducts and Biotechnology (JWCBB), 2011-cont, The Open Process Chemistry Journal, 2008-cont, Food Technology and Biotechnology- 2007-cont, Biologia- Cellular and Molecular Biology, 2007-cont, The Open Industrial and Manufacturing Engineering Journal- 2007-cont, Malaysian Journal of Microbiology, 2004- cont, Applied Biochemistry and Biotechnology, 2004-cont, Brazilian Archives of Biology and Technology, 1997-cont, Process Biochemistry, 1995-cont

Indian: Indian Journal of Biotechnology, 2002-cont, Journal of Microbial World, 2001-cont, Bhartiya Vaigyanik avm Audyogik Anusandhan Patrika, 1999-cont,

PREVIOUSLY

Journal of Scientific & Industrial Research- 2005-2014, Bharat ki Sampada, 2005-2007, International Journal of Food, Agriculture & Environment, 2003-2004, Journal Chemtracks, 2003-2005, Bioresource Technology, 2001-2004, Indian Journal of Microbiology, 1996-2005, Indian Food Industry, 1996, Journal of Microbial Biotechnology, 1995-1999.

ELSEVIER



SEARCH



MENU

Home > Books & Journals > Bioresource Technology

Bioresource Technology

Editor-in-Chief: A. Pandey

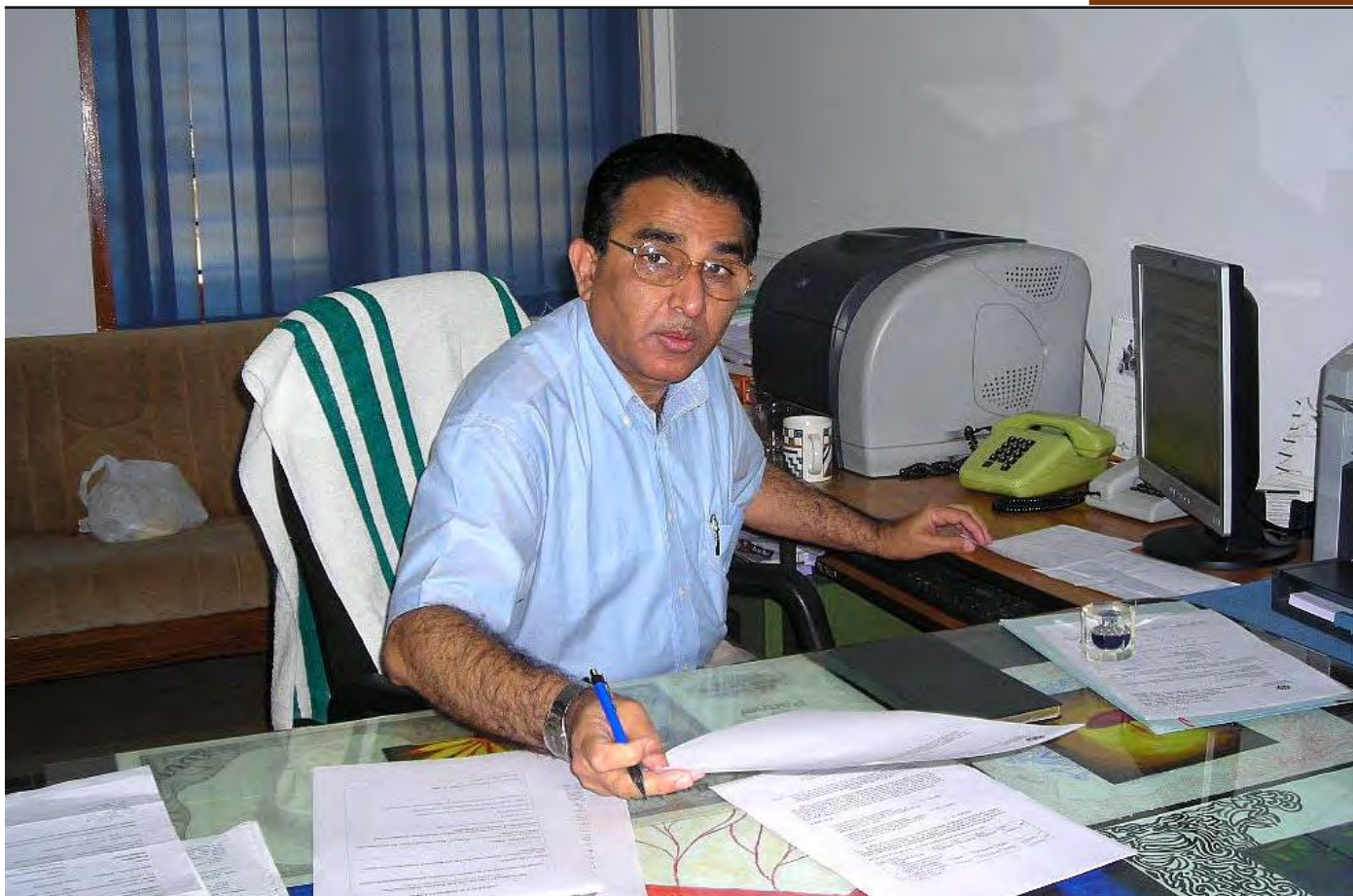
[View full editorial board](#)

[Supports Open Access](#)



ISSN: 0960-8524





Sir What is biotechnology in your perspective and how it is beneficial for Indians?

Biotechnology is a compound subject for teaching purpose, involving multi disciplines of science and engineering, which necessitates an interdisciplinary approach for R&D and transnational research. The latter needs contribution by a team of experts, pooling knowledge and skills together for techno-economic feasibility of the process or product development. In our country, Biotechnology came like a wave, often compared with IT (BT like IT). There are a large number of teaching organizations offering MSc or B Tech/MTech degrees but from these, not many have truly skilled aptitude for Biotech R&D.

As far as application of biotechnology for Indians is concerned, in some way, it is same way for any global population. Bio-based economy development seems a very promising feature for us. This includes food and agriculture biotechnology, medical biotechnology, industrial biotechnology, etc. There have been outstanding innovations and applications in the areas of Health & Pharma, in particular vaccines and diagnostics. So is the case in the area of bioinformatics, although not of same aptitude. Bio-mass based processes and products development on the principles of biorefineries seems an attractive option for the production of chemicals and fuels. Such approaches not only provide opportunities for the business of biotechnology, they also provide employment and environmental protection avenues (due to green processes). I am optimistic that dedicated efforts and contributions being made by the experts from different sectors in our country in Biotechnology RTD will bring lot of good for the common people in our country.

peptidases, cellulases, and also therapeutic enzymes such as L-glutaminase, L-asparaginase, etc. In order to achieve techno-economical feasibility,

I employed solid-state fermentation as the process of production for the enzymes and used regionally available agro-industrial wastes as substrate for cultivating the microbes. Our mission has been to become internationally recognized center of excellence in the areas of our activities, and I am very glad to share with you that on search of scientific publications in SCOPUS (which is one of the most widely used global data search source), you will find my name on the top of lists in the world for publications of research and review papers on (i) solid-state fermentation, and (ii) production of enzymes – industrial. While I was very effortful in generating data-based knowledge on these topics (to publish papers), I was equally conscious to exploit these knowledge for commercial purpose. I am very happy to share with you that we have transferred four technologies on different enzymes to industries. We also have successfully completed several other industrial consultancy projects on industrial enzymes.

With the pace of time and requirement of the nation/CSIR, a major shift was proposed by me in 2002, initiating in a new area of activity, i.e., second generation biofuels, more specifically bioethanol from agricultural

TOP CITED PAPERS OF DR ASHOK PANDEY

SOURCE: Google scholar citation

Title 1-20	Cited by	Year
Solid-state fermentation A Pandey Biochemical Engineering Journal 13 (2), 81-84	1191 *	2003
Advances in microbial amylases. A Pandey, P Nigam, CR Soccol, VT Soccol, D Singh, R Mohan Biotechnology and Applied Biochemistry, 135-52	875	2000
New developments in solid state fermentation: I-bioprocesses and products A Pandey, CR Soccol, D Mitchell Process Biochemistry 35 (10), 1153-1169	779	2000
Solid state fermentation for the production of industrial enzymes A Pandey, P Selvakumar, CR Soccol, P Nigam Current science 77 (1), 149-162	741	1999
Biotechnological potential of agro-industrial residues. I: sugarcane bagasse A Pandey, CR Soccol, P Nigam, VT Soccol Bioresource technology 74 (1), 69-80	716	2000
The realm of microbial lipases in biotechnology A Pandey, S Benjamin, CR Soccol, P Nigam, N Krieger, VT Soccol Biotechnology and applied biochemistry 29 (2), 119-131	656	1999
Micro and macroalgal biomass: a renewable source for bioethanol RP John, GS Anisha, KM Nampoothiri, A Pandey Bioresource Technology 102 (1), 186-193	353	2011
a-Amylases from microbial sources—an overview on recent developments S Sivaramakrishnan, D Gangadharan, KM Nampoothiri, CR Soccol Food Technol Biotechnol 44 (2), 173-184	340	2006
Use of response surface methodology for optimizing process parameters for the production of α-amylase by Aspergillus oryzae F Francis, A Sabu, KM Nampoothiri, S Ramachandran, S Ghosh Biochemical Engineering Journal 15 (2), 107-115	321	2003
Recent advances in solid-state fermentation RR Singhanian, AK Patel, CR Soccol, A Pandey Biochemical Engineering Journal 44 (1), 13-18	317	2009
Fermentative production of lactic acid from biomass: an overview on process developments and future perspectives RP John, KM Nampoothiri, A Pandey Applied Microbiology and Biotechnology 74 (3), 524-534	315	2007
"Solid State Fermentation in Biotechnology: Fundamentals and Applications" Reference Book A Pandey, CR Soccol, JA Rodriguez-Leon, P Singh-Nee Nigam Asiatech Publishers, Inc.	309	2001

wastes, i.e., lignocellulosic biomass such as straw, bagasse, etc. Later, in 2005, firstly we prepared the position paper on this subject for the scientific departments in Govt of India such as TIFAC/DST and then had been a major partner in a CSIR NMITLI project during 2008-2012. Today, our work has a global recognition in this area; we have established a pilot plant for bioethanol from crop residues, which is the first such plant in India under public sector.

One of the most important tasks accomplished by us has been

To better understand this, let us first look at what is 'Biotechnology' understood for the world in terms of business.

Biotechnology R&D costs money
It is a world of business and investment
It is to produce and sell the products
Start-up requires extensive research

mapping the country on the surplus availability of agricultural residues in different regions and states of the country in order to establish their availability for bioethanol production. This report has been published by DST, New Delhi (GoI) and is the most authentic data for not only for researchers from academics and industries but also is a reference book for policy framing by governmental agencies.

Sir What are Milestones of your research you achieved or like to accomplish?

- Establishment of CSIR-NIIST as global leader on research and technological developments in the area of production of industrial enzymes; highest number of SCI publications in the world and transfer of four technologies to industries, which have been successful commercially (Source: SCOPUS).

- Establishment of CSIR-NIIST as world leader on research and development in the area of solid-state fermentation (Source: SCOPUS),

- Creation of Centre for Biofuels and establishment of pilot plant for bio-based processes and products development- first such pilot plant in the country,

- Successful on industrial consultancy projects, focus on regional resources utilization,

- Establishment of CSIR-NIIST as top institute in the country on developing basic knowledge on enzymes for biofuels and on lignocellulosic

bioethanol (as evidenced by SCOPUS search),

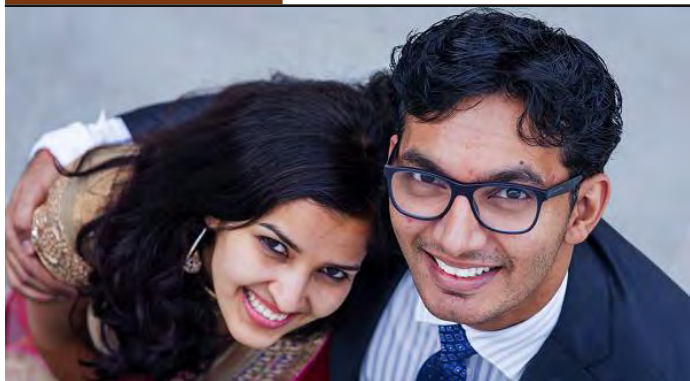
- Networking and consultancy with the International Energy Agency for India Country Report on Second Generation Biofuels.,

- More than 400 papers,

- About 50 books (40 published; others in the process),

- H index of 70 and > 21,000 citations (Source: Google scholar),

- Creation of the Biotech Research Society, India (www.brsi.in), which is one among the most active



Neha (Daughter)-Abhinav (Son-in-law)

Neha is Senior Industry Analyst in Google, San Francisco and Abhinav is Reliability Engineer in Intel, San Francisco)



Rahul (Son)-Preeti (Daughter-in-law)

Rahul is Senior Technical Manager in Amazon, Seattle and Preeti is dental doctor practicing at Seattle)

Family of Dr Pandey



scientific professional society in our country, having seven international MoU and ~ 3000 life members,

- Creation of International Forum on Industrial Bioprocesses (www.ifibiop.org), a networking forum of ~ 25 countries,
- Large number of national and international awards,
- Editor-in-chief of BIORESOURCE TECHNOLOGY.

How the expenses incurred during research work are fulfilled?

I do not think that for quality research, there is dearth of funds in our country. In any R&D project or industrial consultancy projects, it is your performance and commitment to deliver, which matters most. While I do not remember having

fund crunch for any of my R&D plans and projects during past 25 years, last 10-12 years have been much more productive with large number of industrial projects and financial supports from India and abroad as well as funding from governmental agencies such as DBT, DST, MNRE, ICMR, etc. We have been quite successful in developing network mode projects with sharing of tasks and responsibilities, complimenting expertise of the partners. I strongly believe that network mode projects deliver much better.

What aspects of your work do you think could be described as Indian science? What do you think are the challenges of using traditional ways of knowing with Indian science?

The entire activities on industrial enzymes and solid-state fermentation are surely fully and completely 'Indian science'. I do remember the late 1980's when we submitted our research work to some so-called 'big' journals, then at times, we got the manuscript back quickly with a remark of the editor of the journal that the work might be of local or regional interest. However, this just became history only in the years to come as the inherited advantages offered, for example, by solid-state fermentation, at least for some industrial processes, made it technological solution of choice.

The entire R&D carried out by us on lignocellulosic bioethanol is truly Indian in all aspects, right from its conceptualization in the form where it stands today, till the integration of the entire process.

As far as technological challenges are concerned, we must keep in mind that our conditions are very different from other countries in various aspects. A very typical example is on municipal solid-waste management. Most of the processes, which have been development in Europe or US do not work for



Dr Pandey with wife, Mrs Sushama Pandey, who always supported him for professional excellence.

Indian MSW. Among various reasons for this, one important reason is the too wet nature of Indian MSW when compared to those from the said other



Light moments with Prof Javed Iqbal and Prof TK Chandrasekhar (former Directors of NIIST) and Dr Radhakrishnan Pillai, Director, RGCB, Trivandrum during NHB-2007

countries. Same is the situation for lignocellulosic bioethanol program and technology. Indian biomass and their availability is far different than those from Europe and US. One major difference, for example, is about the farm size, which in India are typical much smaller than those countries. Thus, the whole scenario gets changed with this kind of variation.

How do you think scientific research, which contains a lot of technical language and data, can be more accessible to the general public of India?

Well, while all these years there has been much interest and emphasis on so-called basic research (and publication of papers), the need of time for the researchers is to involve more on translational research with the concepts of lab to land to field, or lab to production. We are more and more understanding these issues and are surely moving towards these directions, although at very slow pace. We need to truly march much faster on developmental to translational research. An important point in this regard is the partnership of industries with hand-holding principle to move forward together.

What do you enjoy most about being a scientist?

- Sharing knowledge and ideas with colleagues and students;
- Developing national and international collaboration and networking with academics and industries pooling expertise for the benefit of scientific community in particular and public at large.

Any comment on GMOs?

+I very strongly support GM crops in particular, although not find true feasibility for GM microbes at large-scale application. I support use of those GM crops, which have proven data on safety and risk, as today I do not think there is any other better option for increasing the food production than GM crop.

Can you tell us about future goals of your lab?

- As I have mentioned above, four of our enzymes processes have been transferred to industries; these have been essentially lab processes. With the establishment of pilot plant, I would like to develop now the technologies, which have matured at pilot scale.
- I would like to ensure that lignocellulosic bioethanol program reaches to commercial success in near future (short term goals).

Any message to Life sciences community of India.

Science has no boundaries; science needs to be done with passion, hard work and dedication. We must be very clear in identifying quantifiable outputs with defined timeline on the project we undertake and must have concept how to proceed on translating the achieved 'outputs' to 'outcomes'. Awareness about the current literature for the state-of-art information on the topic, including IPR, and identification of current status, for example, quantity and cost for a product must be known to you.

" I believe (and practice) that time is either used or wasted (not passed) and that in life, learning by doing is the best tool. Knowledge and experience sharing and listening to others are keys to be successful and to develop and nurture the team spirit."

- Ashok Pandey