Dr. Nitin K. Labhasetwar

Chief Scientist and Chair Environmental Resource Planning & Management (Including Energy, Air and Water Resource), Professor, Academy of Scientific & Innovative Research (AcSIR)
CSIR-NEERI, Nagpur, 440020

Linked in: https://www.linkedin.com/in/nitin-labhsetwar-75a28197/

google scholar- https://scholar.google.com/citations?hl=en&user=snXq-mEAAAAJ&view_op=list_works&sortby=pubdate

Educational Qualifications:

Degree etc.	Year	University /Institute	Subjects
M. Sc. (Master of Science)	1986	Dr. H S Gour Central University, Sagar, India	Analytical Chemistry. **Dr. Darbari Medal for 1st Class 1st Position in the University**.
Ph. D. in Science (Chemistry)	1990	Dr. H S Gour Central University, Sagar, India	On Topic- "Ion exchange and absorption properties of some calcium silicate hydrates and other silicate minerals". Received SRF, JRF from CSIR and MPCOST
STA-JSPS Post-Doctoral Fellowship	2000-2002	National Institute for Materials Science (NIMS), Tsukuba, Japan	Catalytic and other materials including Nano-materials for Energy and Environmental Applications

Areas of Expertise & Research Experience:
Cleaner Energy; Materials including Catalysts and Adsorbents for Energy and Environmental Applications; Air Pollution Control; Water Treatment and Management, Cleaner Mobility, Clean Combustion Devices including Improved Cookstoves, Resource Management and Waste utilization; CCUS and Sustainability; Chemical Looping Combustion, Environmental Applications of Sensors and Drones etc.

All the details provided below are as a PI/Co-PI or Main / Co-author or Inventor / Co-inventor, except for personal recognitions. It is always a collective team work.

1. Details of projects and approximate ECF generated:

- Contributed to over 140 projects including those funded by Industry, CSIR, Government Agencies, International Organizations
- **Coordinated as a Champion/ Nodal Officer** of 12th plan CSIR-Network project ***Clean Water: Sustainable Options*; involving 16 CSIR labs and more than 100 scientists,** resulting in tangible outputs with minimum expenditure of CSIR funds and strengthening Networking among CSIR institutes
- Actively contributed as PI/Co-PI to several important major projects including- Namami Gange; TAPSUN; USEPA Diesel project; NTPC CCUS project; ALCOA and UNICEF Defluoridation projects; MITSUI project; MOEFCC Retrofitment project, INDIA-H2O under Horizon 2020; CSIR-800, CSIR-AI Mission, Glenmark Foundation CSR project, CSIR-FTT Projects, DST-SHRI project; CEFIPRA sponsored project to name a few.

Industry connects and project sponsorships:

Actively contribute to Industry (including public sector enterprises) sponsored projects as well as collaborations. I significantly added Industry clienteles to the Institute including: Reliance;

Glenmark Foundation, Sowball, Alcoa, BHEL, NTPC, IOCL, TVPL, ESTPL, MBDB, Water Freedom, Ecosense, Ecumenical Sangam, Punjab Renewables, EconoGreen, Cummins, GPPL, Johnson Matthey, Sud-Chemie, Mitsui Catalyst, BOSCH, S R Industry and International project clientele including USEPA, JARI Japan, Alcoa, USTDA, UNICEF, Mitsui.

2. **Publications: As per google scholar-** https://scholar.google.com/citations?hl=en&user=snXq-mEAAAAJ&view_op=list_works&sortby=pubdate

Total Publications: 228 including non-SCI and general articles.

h-index: 54; i10-Index: 129, Citations: 10,085; Citations during last 5 years: 4600

Publications also includes those recognized among the highest IF and top cited papers of CSIR including in journals like Chemical Reviews (IF 76), Energy & Env. Sci. (IF 40), Chem Engg J (IF 17)., ACS Catalysis (14), Appl Catal-B (IF 24) etc.

3. **Patents Granted and Filed: International: 20, National: 16, Design Registrations: 6**

4. **Translational Research/ Technologies/ Processes developed and disseminated:**

   i. **GreenDispo:** An Energy efficient, ***Improved sanitary pad incinerator*** jointly developed with ARCI Hyderabad and Industrial partner Sowbal Aerothermics. Already licensed and commercial deployment are in progress. More than 1600 units installed by the Licensee so far.

   ii. **NEERDHUR, Improved Cook stove:** An improved cookstove, with certified performance (BIS 13152) for thermal efficiency and emissions, and duly recognized as one of the most efficient natural draft cookstoves under 2kW by MNRE, GoI. Technology licensed and more than 55,000 NEERDHUR units produced/ being produced by the licensee already benefitting more than one lakh rural poor.

   PAVAK Concrete based improved cook stove: Successfully developed and tested for field trials at pilot scale (over 200 units). Large scale dissemination by **Glenmark Foundation** started with target of one lakh PAVAK by March 2025 with financial outlay of over Rs. 10 Crores by the sponsor targeting rural beneficiaries of over 4 lakhs. Awareness campaigns for Clean Cooking Energy in more than 30 villages already completed with target of additional 100 villages by March 2025.

   iii. **NEERIKSHAN-AQ:** A unique drone / UAV assisted monitoring device, capable of vertical air monitoring is developed, as vertical profiling is now a days a critical requirement to assess air pollution in hot-spots of urban centres. This device is used for environmental sampling including at sites, which are difficult to access. A new generation drone/sensor/ AI-ML based water / wastewater sampler has also been developed and currently under trials in association with CSIR-NAL and CEERI. Expected to be launched for dissemination by April 2024.

   iv. **Indigenous Low-cost Catalytic converter technology for auto-exhaust emission control**

   Technology was developed and transferred in 1996 at a License fee of Rs. 50 lakhs to M/s GPP Limited Vadodara/ Mumbai, however, limited success achieved on commercial exploitation by the entrepreneur

5. **Contributed in initiation/strengthening of following Research Areas in the R&D institutions in India:**

   Low-cost Diesel Soot Oxidation Catalysts: Exploiting the research experience gained during post-doctoral studies abroad, applicant is among the first researchers to contribute to this R&D area in India.

   Chemical Looping Combustion (CLC): Among the very first Indian researchers to work on development of Oxygen Carriers (key research challenge for CLC) in India. Project team led by

me has reported new generation of mixed oxide based oxygen carriers (concurrently reported by a Swedish lab) for the first time.

Retrofitment of in-use/ old vehicles for their emission control: India has very large population of old polluting vehicles with poor maintenance of vehicles, which leads to high emissions from these in-use vehicles. I am among the first scientists in India to work on this important area and presently leading a project from MOEFCC, GoI in collaboration with ARAI Pune.

Also actively contributed (as Co-PI/ Co-inventor) for strengthening important areas e.g. **Photocatalytic water splitting; CO_2 capture materials, Nano-materials for water treatment, Environmental applications of Drones & Sensors** in the country**.**

6. Recent Research works/Projects as PI/ Co-PI and other activities:

i. **Retrofitment of old/in-use vehicles**: This is an activity of National importance to combat air pollution from old vehicles. Phase-1 of MOEFCC (GoI) sponsored project with ARAI as partner is completed with Phase-2 expected to start by Feb 2024 (to be completed by Dec 2024). Overall budget: Rs 2.5 Crores.

ii. Clean cooking energy devices: Active dissemination of NEERDHUR and PAVAK improved cookstoves are underway with a target of over 2 lakhs units by March 2025 benefitting over one million rural people with support from Industrial CSR and Carbon Finance projects.

iii. AI-Mission and DST-SHRI Projects: Next Generation drone, sensor and AI-ML supported devices for monitoring of waste dump sites for GHG emissions, air quality monitoring and other environmental applications under the CSIR AI mission and DST-SHRI programmes.

iv. Bio-energy related activities: There are two projects including one recently awarded by CEFIPRA (Indo-French) project dealing with advanced R&D aspects of bio-energy

v. Dissemination of Energy efficient sanitary Pad Incinerator and Biomedical Waste Incinerator: As detailed above, GreenDispo incinerator is already being disseminated, while an energy efficient biomedical waste incinerator is under pilot scale testing. These are potential technological interventions to address waste management.

vi. **Chemical Looping Combustion (CLC) and Hydrogen Generation:** CLC is considered as a potential option for gaseous fuels and offers sequestration ready CO_2. CLC process for blue hydrogen generation also needs attention and we are planning to explore the same

vii. Grooming young scientists for leadership roles in the domain: I have started systematically grooming younger colleagues to take up the potential areas forward as identified by CSIR. **Currently leading a Vertical with over 70 members including project staff.**

7. **<u>National/ International committees:</u>**

Member of several expert committees including- CPCB (Expert-Air Pollution and Automobile Pollution); MOEFCC; DST-TDB; Niti Aayog, DBT; DST-FIST; CSIR; CEFIPRA (Indo-French); Innovation Council-LITU; BOS-NICMAR; IPR Committee-VNIT; Global COE Board of Kyushu University; Sustainable automobiles (JARI Japan); **Governor's Nominated Member of the Senate of Gondwana University** and Member of BOS/ Academic councils. Advisory Board Member for Clean Energy Practitioners Association 2019, Expert member for other reputed educational institutions. Editorial Board member- ACS-Omega and other journals. **Board Member** and Institute Representative for Global Centre of Excellence (GCOE) programme of Kyushu University Japan involving R&D/ Academic Institutions from seven countries (2009-2013). **Member of the International working group** on **"Sustainable Automobile Society"** coordinated by Japan

Automobile Research Institute during 2008-2010. Expert evaluator for UKRI, Horizon proposals, Polish Academy of Sciences, Kazakh Academy of Sciences.
Contributed as an expert to some of the important / sensitive cases with Hon. National Green Tribunal.

8. **Institutional committees:** I have significantly contributed and continue to contribute in large number of Institutional committees mostly as a Chairman/Co-chairman including AcSIR Committee; GoS; Scientific Ethics & Scientific Vigilance; Publications; Scientific Investigation Board; ISTAG; Project Monitoring; TNPC; Investment & Budget; R&A; Zonal Labs coordination; Outreach; Rajbhasha, Agreement-MoU.

9. **Honors / Awards / Recognitions/ Fellowships/ Assignments (Only select):**

Name of the Award	Awarded by	Year
VASVIK Award	Vividhlaxi Audyogik Samshodhan Vikas Kendra	2020
Honorary Fellow	Indian Association of Analytical Scientists	2024
Distinguished Scientist Award	Indian Asso. of Solid state Chemists & Allied Sci.	2019
Fellow	International Soc. of Energy, Env. and Sustainability	2017
Fellow	Maharashtra Academy of Sciences	2014
Honorary Fellow	Indian Society of Analytical Scientists	2014
Visiting Professor	Kyushu University, Japan under the Global COE Programme	May-June 2009, 2011
Dr. Arvind Kumar Award	Indian Council of Chemists	2009
STA- Post-Doctoral Fellow	Science & Technology Agency Japan	2000-2002
JSPS Invitation Fellow	JSPS, Japan, at NIMS Tsukuba Japan	April 2003
NIMS Visiting Researcher	Nat. Inst. Materials Sci. Tsukuba Japan	Dec. 2007, 2008
Young Scientist Award	Indian Science Congress Association	1993
NIMS Japan Overseas Researcher	Nat. Inst. Materials Sci. Tsukuba Japan	June 2004, 2005
Hindustan Platinum Award	Catalysis Society of India	2003 & 2005
Golden Jubilee Outstanding Performance Award	CSIR-NEERI, Nagpur	2007-08

10. **Establishing important international collaborations for CSIR:** Responsible for establishing the following Institute level international collaborations, which has benefitted several scientists and students:
    - Sister Institute Research agreement with **National Institute for Materials Science, Tsukuba Japan**
    - **Institute of Inorganic Chemistry, Rez. Czech Republic. Kyushu University Japan**.

    Also established research contacts with Japan Automobile Research Institute, Hiroshima University Japan, IHE Netherlands, University of Birmingham, University of Nottingham, KAUST Saudi Arabia; University of Rennes France, King Saud University Saudi Arabia and other International R&D Institutions.

11. **Actively contributed in Socially relevant R&D including coordination of CSIR-800/HARIT programme:**

Actively contributed as a Coordinator of the CSIR-800 and HARIT programmes at CSIR-NEERI. In addition to extensive field works related to the projects dealing with control of indoor air pollution from cooking energy and dissemination of improved cook stoves NEERDHUR, I have provided

scientific and other support (as a Coordinator) to other PIs who have developed several other interventions for rural applications.

12. **PhD / MTech Supervision: Supervised 15 PhD scholars for PhD and 3 ongoing; 4 Masters Students, several post-doc and project fellows. Also contributing as an AcSIR Faculty.**