

DEPARTMENT OF  
**CHEMICAL**  
**ENGINEERING**

## ABOUT THE DEPARTMENT



### PROFESSOR B. N. THORAT

*B. Chem. Eng., M. Chem. Eng., Ph. D (Tech) D.H.S.T. (BITS)*

Head, Department of Chemical Engineering,

This year the chemical engineering faculty members published **159** papers in International refereed journals, **10** book Chapters, **34** patents, presented **16** papers in National and International conferences and **38** invited lectures were delivered in industry, symposia, and workshops.

**The faculty members of the Department received very prestigious awards and recognitions for their contributions to the profession.**

Prof. G.D. Yadav honored Padma-Shree by President of India in 2016. Prof. B.N. Thorat was felicitated by NOCIL award for Excellence in Design of new Equipment and Process in 2015 and also awarded by UKaid-FICCI, Millennium Alliance Rs. 10 lakhs US Dollars in 2016. Prof. V.G. Gaikar joined as a Vice Chancellor in Dr Babasaheb Ambedkar Technological

University, Lonere. Prof. S.S. Bhagwat awarded for INSA Best Teacher Award 2016. Prof. A.B. Pandit nominated as fellow of World Academy of Science 2015. Prof. P.K. Ghosh awarded by Honorary Fellow, Indian Institute of Chemical Engineers and Lifetime Achievement Award from Indian Chemical Council. Prof. M Lakshmi Kantam received Eminent Scientist Award – Catalysis Society of India. Prof. A.M. Lali was awarded as BIRAC Innovator Award 2016 by DBT & Chairman BIRAC, 2016 and he received UAA-ICT Distinguished Alumnus Awards in Academic, 2015. Prof. V.K. Rathod was awarded with Fellow of Maharashtra Academy of Sciences. Dr. P.R. Gogate felicitated by -Outstanding Professor Award given by Indian Specialty Chemicals Manufacturing Association.

In department **18** Ph.D. theses were submitted along with **40** Masters theses. The number of Ph.D. Candidates in the Department is **223** and the number of M. Chem. Engg. With M.Tech has reached to **77**,

all with full scholarship from Department of Atomic Energy, Department of Biotechnology, CSIR, Department of Science and Technology, and several industry sponsored projects. Safety course conducted for all Master students. It covers Process safety, Fire safety, Bio safety and radiation safety which are taught by Eminent faculties. Every year Department is organising Summer Training and In-plant Training programmes for Undergraduate students.

This year also saw a very good placement for the Graduates of the Department. We have placed **100%** of students in Industry through campus interviews with minimum salary of **4 lakh**, a maximum of **13.8 lakh** per annum. All these placements are in core manufacturing sectors of chemical industry. Amongst post-graduates also **80%** of the candidates placed in Industry and **20 %** students have enrolled for PhD program at the time of the report.



## PROFESSOR B. N. THORAT

B. Chem. Eng., M. Chem. Eng., Ph. D (Tech) D.H.S.T. (BITS)  
 Head, Department of Chemical Engineering  
 Professor of Chemical Engineering

### FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES:

- President, World Forum for Crystallization, Filtration and Drying (WFCFD)

### HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT (MAXIMUM TWO SINGLE- SPACED PAGES WITH FIGURES/DIAGRAMS ETC.):

- Although considerable amount of techniques are developed to dewater waste activated sludge not many ETPs and CETPs in India are using them practically. The resources found in municipal wastewater treatment sludge, more recently called bio-solids, are rich in nutrients and energy along with some minor components. Therefore, on-site filtration experiments were carried out at the local CETPs. The consequences of several operational parameters such as effect of pressure, filtration media, coagulant addition, etc. were studied. The characteristic properties such as cake resistance, medium resistance, cake porosity, cake compressibility were also determined along with the elemental analysis of the cake. It was found that the CETP is not operating at the optimum conditions. This data will enable us to intensify the CETP operations and consequently minimize the operating costs.
- Turmeric, traditionally known as Haldi, an important medicinal plant and spice, is produced by 15 lakh farmers on 5,00,000 acre of land. Traditional turmeric processing is laborious, consumes 30 days and costs Rs. 30,000/acre. The processing also leads to non-availability of the land for the next crop for considerable time period. HaldiTech is a novel technology developed during Ph.D. work that can process 10,000 kg of turmeric (produce of 1 acre) in 24 hrs with targeted Rs. 15,000 as against traditional process that takes 30 days and costs Rs. 30,000. HaldiTech targets Rs. 1500 crore annual market of turmeric processing through agri-waste based novel drying technology.
- Jaggery is a traditional Indian sweetener but has been replaced by sugar in Indian household because of its hygroscopic nature. The importance of jaggery as a sweetening agent has increased recently because of its medicinal properties. Thus there is need to make jaggery available in free flowing powder form. This study analyses strategies for granulation of jaggery and difficulties encountered in upscaling of the process.
- Slack coal, generated during the process of mining, transportation, handling and on exposure to the weather, can be utilized effectively by forming briquettes, which otherwise goes waste or sold at low price. Briquetting of slack coal involves binder, which is driving factor for economic consideration. In Present study, efforts are being made to develop cost effective binder or sustainable binding technique.
- Solar conduction dryer (SCD) is a unique technology that uses conduction, convection and radiation mechanism of heat transfer making it one of the most efficient system. The SCD is one of the most effective piece of equipment

and it has tremendous potential in India and other erstwhile nations where there is abundance of solar insolation. The most cost-effective dryer which runs on no electricity needs further understanding for the improved performance. The objective of the proposed is to understand the flow pattern, temperature profile and impact of various design parameters of SCD on drying. Based on the experimental insights, CFD models has been developed to quantify the effect of design and operating conditions.

- Most of the drugs, nutraceuticals like vitamins, probiotics have their stability issue. They are prone to thermal, oxidative, photolytic, acid degradation. It is very necessary to deliver them on targeted site without degradation. Microencapsulation is the one of the technique used to increase stability, bioavailability and solubility of nutraceuticals. Spray drying, extrusion, solvent evaporation, fluid bed drying techniques are used for microencapsulation.
- Grand Challenges India Project “Ensure year-wise nutritional food security to Indian Women through Community level implementation of Domestic Solar Conduction Dryer (SCD)” [Supported under Grand Challenges India, funded by BIRAC,

Gates Foundation, USAID and DBT]. In this project, SCD was provided to 230 rural women farmers in Aurangabad and Shahapur, Maharashtra, so that they can preserve seasonal produce, consume it during lean period to overcome malnutrition and earn additional income through sale of dehydrated food products. Nutritional labeling of 20 fruits and vegetables have been carried out to estimate the retention of nutrients in SCD-dried food as compared to fresh.

**TOTAL NO. OF PUBLICATIONS (PEER REVIEWED) SO FAR : 65**

**TOTAL NO. OF PATENTS : 04**

**TOTAL NO. OF CONFERENCE PROCEEDINGS/PAPERS : 88**

**TOTAL NO. OF SEMINARS/LECTURES/ORATIONS DELIVERED : 04**

**TOTAL NO. OF PH.D.s AWARDED AS SINGLE/ CO-GUIDE : 18**

**TOTAL NO. OF MASTERS AWARDED AS SINGLE/ CO-GUIDE : 50**

**H-INDEX : 15 CITATIONS : 756**

**NAME : Bhaskar Narayan Thorat**

**SUBJECTS TAUGHT DURING 2016-17 : Unit Operations, Perspective Of Society In Science And Technology**

**RESEARCH INTERESTS**

: Drying Technology and Particle Handling, Process Development, Multiphase reactors, Industrial Crystallization and Filtration.

**NUMBER OF RESEARCH STUDENTS CURRENTLY WORKING :**

P.D.F.- 01 Ph.D. (Tech.) - 06

Ph.D.(Sc) - 01 M.Chem.Eng - 02

Others (if any) -

**NUMBER OF RESEARCH PUBLICATIONS:**

**INTERNATIONAL- 01**

**NATIONAL- CONFERENCE**

**ROCEEDING- 04**

**PEER-REVIEWED- BOOKS-**

**NUMBER OF PATENTS:**

International - 01

Indian - 03

**Number of sponsored projects :**

Government- 01 Private- 04

**Professional Activities**

**(Membership of important Committees):**

Organizer 11th International Workshop on Crystallization, Filtration and Drying. Theme: Drying and Granulation Technology, Feb 2016, Mumbai.

**SPECIAL AWARDS/ HONOURS:**

- Chief Guest at Lecture at National Seminar on ‘Challenges and Opportunities in Food Packaging’ held at IICPT on 23rd September 2016, IICPT, Thanjavur.
- Millennium Alliance award by FICCI for implementation of SCD in Nepal



- Millennium Alliance award by FICCI for implementation of CassavaTech in Kenya
- Grand Challenges Agri-Nutrition award for implementation of SCD in Bangladesh



PanAsia Heat Pump Dryer



Puschner Microwave Dryer



Labultima Spray Dryer



Brookfield Particle Flow Tester



Labconco Freeze Dryer



Convective Hot Air Dryer



Solar Conduction Dryer



## PROFESSOR S. S. BHAGWAT

*B.Chem. Engg, M.Chem. Engg, Ph.D.(Tech.)*

Professor in Chemical Engineering

### PROFILE AND ACCOMPLISHMENTS SO FAR

#### Fellowships/ Memberships of Professional Bodies :

- Indian Institute of Chemical Engineers - Life Member and Past Chairman of Mumbai Regional Center
- Oil Technologists Association of India - Life Member
- Society for Industrial Chemistry - Life Member
- Indian Society for Surface Science and Technology - Life Member, Hon Secy, Western India
- Maharashtra Academy of Sciences - Fellow (2008)
- Industrial and Engineering Chemistry, American Chemical Society - Former Member, Editorial Advisory Board
- Journal of Surface Science and Technology - Member, Editorial Board

**HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT (MAXIMUM TWO SINGLE-SPACED PAGES WITH FIGURES/DIAGRAMS ETC.): (GIVEN AT THE END OF**

### THE DOCUMENT)

**PUBLICATIONS (PEER REVIEWED) SO FAR : 64**

**PATENTS : 8**

**CONFERENCE PROCEEDINGS/PAPERS: 64**

**SEMINARS/LECTURES/ ORATIONS DELIVERED : >100**

**PH.D.S AWARDED AS SINGLE/ CO-GUIDE : 32**

**MASTERS AWARDED AS SINGLE/ CO-GUIDE: 71**

**H-INDEX : 12 CITATIONS: 585**

#### SUBJECTS TAUGHT DURING 2016-17:

- Chemical Engineering Thermodynamics-I
- Chemical Engineering Thermodynamics-II
- Interfacial science and engineering

#### SPECIFIC RESEARCH INTERESTS:

Energy and exergy analysis, Interfacial science and engineering, Computer process simulation

### NUMBER OF RESEARCH STUDENTS CURRENTLY BEING SUPERVISED :

P.D.F. - RA -5  
Ph.D. (Tech.) - 6 Ph.D.(Sc) - 6  
M.Tech. -1 M. Chem.  
Eng- 2  
M.Sc - Other (if any)-

Undergraduate Summer Fellows (if any) - 3

Teacher summer Fellows (if any) -

### NUMBER OF RESEARCH PUBLICATIONS:

**NATIONAL - 1**  
**INTERNATIONAL - 3**  
**(PEER-REVIEWED) -**  
**CONFERENCE PROCEEDING - BOOKS (IF ANY) -**

**NUMBER OF PATENTS : International -**  
**Indian**

**NUMBER OF SPONSORED PROJECTS : Government- 1**  
**Private - 6**

### PROFESSIONAL ACTIVITIES:

- Membership of important Committees: Member, Complaints council,

Advertising Standards  
Council of India Expert  
member, NBA committee

- Membership of Editorial Boards with name of journal and agency: Journal of Surface Science

and Technology, Member  
Editorial Board

**SPECIAL AWARDS/  
HONOURS / ACCOLADES :**  
Awarded Best Teacher Award  
by INSA, 2016



### PROFESSOR V. G. GAIKAR

*FNAE, FMASc, MIIChe, FMOTAI, MISSST, MAMIC*

Vice-Chancellor, Dr. Babasaheb Ambedkar Technological  
University, Maharashtra, (from March 2nd, 2016)

(on leave from the position of Bharat Petroleum Distinguished Professor  
of Chemical Engineering) Institute of Chemical Technology (formerly  
UDCT) Matunga, Mumbai-400 019.

## PROFILE AND ACCOMPLISHMENTS SO FAR

### EDUCATIONAL QUALIFICATIONS

Sr. No.	Degree	Subject	Class	Year	University	Additional particulars
1	B.Chem.Engg	Chemical Engineering	<b>Distinction</b> 71.8%	1982	University of Bombay	<b>5<sup>th</sup> Rank</b> in University
2	M.Chem. Engg	Chemical Engineering	<b>Distinction</b> 72%	1984	University of Bombay	<b>2<sup>nd</sup> Rank</b> in University
3	Ph.D.(Tech.)	Separations Through Reactions	By research	1986	University of Bombay	<b>Best Ph.D.(Tech.) Thesis</b> Award

Period	Place of employment	Designation
March 2016 – to-date	Dr. Babasaheb Ambedkar Technological University	Vice-Chancellor, BATU, Lonere
Aug 2013 -Feb 2016	Institute of Chemical Technology	Coordinator, UGC- National Resource Centre in Chemical Engineering & ICT-DAE Centre for Chemical Engineering Education and Research
July 2008-Feb 2016	Institute of Chemical Technology	Institute Coordinator, Technical Education Improvement Quality Program (TEQIP)
July 2009 to Aug 2012	Institute of Chemical Technology	Head, Dept. Chemical Engineering

July 2002-todate	Institute of Chemical Technology	Bharat Petroleum Professor of Chemical Engineering
Feb.1992-July 2002	Department of Chemical Technology, University of Bombay	Reader in Chemical Engineering
August 1985 - February 1992)	Department of Chemical Technology, University of Bombay,	Lecturer in Chemical Engineering
July 1984-August 1985	Department of Chemical Technology, University of Bombay,	Associate Lecturer in Chemical Engineering
January 1989-December 1989	Department of Chemical Engineering, University of Edinburgh, Edinburgh	Visiting Lecturer in Chemical Engineering

### HIGHLIGHTS OF RESEARCH WORK AND ITS IMPACT:

Highlights of research work and its impact:

Professor Vilas G. Gaikar, a fellow of Indian National Academy of Engineering, has made outstanding research contribution to Chemical Engineering Science that has been applied by many industries in India and abroad. His work on Dissociation extraction and dissociation extractive crystallization has been practiced in chemical industry where the other conventional methods of separation have been either economically impractical or are difficult to employ. His process of reactive crystallization for m-/p-cresols was the first of its kind with extreme selectivity for separation of this most difficult-to-separate mixture.

Innovative approaches by synergizing theoretical developments with practical

applications are hall marks of the work done by Professor Gaikar in academic research and as a consultant to several industrial concerns in the last two decades. He had been a consultant to a leading alcohol-based industry for development of many new extraction and purification processes for natural products as medicinal compounds or nutraceuticals. Many of these processes have been patented by the company and practiced for commercial production of the products. As a Chair Professor on a position created by Bharat Petroleum Corporation Ltd. in the Institute of Chemical Technology (ICT), he has developed newer and novel technologies for the company, most recently for upgradation of vacuum residue and waste water management. He had developed a large number of oleochemicals from castor oil that were manufactured and marketed by another industrial concern.

Professor Gaikar extended his work on reactive separations to complex distillation columns including reactive distillation, salt effect in distillation and complex heterogeneous azeotropic distillation column designs. In particular, he had analyzed and successfully showed economical operation for a multicomponent azeotropic distillation column involving acetic acid-water mixtures in India's leading petrochemical company.

In the last few years, his group has developed several reactive sorbents for heavy metal extraction with extreme selectivity towards desired metal ions, affinity adsorbents for a number of closely related organic compounds, functionalized sorbents for capture of carbon-dioxide and nanoparticle synthesis having potential applications in pharmaceutical and specialty chemical industries. Currently, his group is working on several



specialty chemicals' synthetic reactions for development of continuous processes to improve selectivity to desired product and to minimize waste with energy integration.

In the area of Biofuels, biolubricants, biodiesel, thermochemical conversion of biomass, his group has attained several newer milestones and some of this work has been used at industrial and large scale applications. The thermal conversion of lignocellulosic biomass is being developed to establish biorefinery concept. Another offshoot of this work is establishing, 'Steam Pyrolysis' as a waste treatment technique for dealing with concentrated organic waste.

His contribution to the field of hydrotropy and complex mixtures with surfactants has been pioneering, especially considering that his contribution has come entirely from the work done in ICT, India. His work, for the first time, established sodium ibuprofen as an efficient hydrotrope and drug solubilizer which is now being used in several drug formulations. He has also developed several formulations of hydrotropes with surfactants for potential applications in drug and pesticide industries. His group has successfully developed aqueous solutions of hydrotropes based extraction process for natural products as an alternative to organic solvents that is also easily scalable to

industrial operations. Recently his group has successfully conducted delignification using aqueous solutions of hydrotrope as a substitute for chemical conversion techniques. The aqueous solutions are also useful in conducting organic synthesis as safer media and provide ease of recovery of products. His work on biochemical applications, using organic solutions of reverse micelles, is also recognized as first of its type, mostly for enzyme and protein recovery by cell permeabilization and purification.

Apart from his industrial and corporate relations, Professor Gaikar was rated as the Best Teacher by University of Mumbai in 2002 and several times by the students of the Institute. He is known for his innovative and out-of-box ideas for promoting engineering and technical education in the country, and inspiring young engineers to innovate. His originality in conceptualizing the Industry-Academia interaction in the form 'Young Innovator Choice Competition' in ICT has brought young chemical engineers/ technologists from all corners of the country and several industries seeking innovative answers for their problem, on the same platform. This year, he conceptualized the idea of 'Innovation Networking' of engineering institutes in the State of Maharashtra and is spearheading the efforts of

ICT in spreading the spirit of Innovation among young engineers

#### FELLOWSHIPS OF NATIONAL AND INTERNATIONAL ACADEMIES OF SCIENCE OR ENGINEERING (IF ANY):

- Fellow of National Academy of Engineering (FNAE)
- Fellow, Maharashtra Academy of Sciences (FMASc)

#### FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES

- Director, Aarti Drugs Ltd. (2006-to date)
- Director, Bharat Oman Refineries Ltd.(2014- to date)
- Chairman, Expert Committee, Research, Innovation and Technology Transfer, RUSA-SPD, Maharashtra
- Member, Sectional Committee (Chem Engg), Indian National Academy of Engineering (INAE) (2015-), New Delhi
- Member, TASK Force, Bioenergy Sciences, Department of Biotechnology, Ministry of Science and Technology, GoI.(2014-)
- Member, Working group- Innovation Council, Maharashtra State(2015-)
- Member, National Program on Carbon Capture, Department of Science and Technology, GoI(2015-)
- Member (co-opted), PAC-

- SERB, Department of Science and Technology(2015-)
- Member, TASK Force, Empowerment and Equity Opportunity for Excellence in Science, SERB, Ministry of Science and Technology, GoI.(2013-14)
  - Member, Empowered Board, RDCIS- SAIL Project for Waste Water management in Steel Industry (2010-16)
  - Coordinator, ICT-DAE Centre for Chemical Engineering Education and Research(2013-2016)
  - Institute Coordinator, Technical Education Quality Improvement Program(MHRD, GoI), (2009-16)
  - Coordinator, TEQIP Innovation Networking, Maharashtra State (2014-2016)
  - Member, Advisory Committee, UGC-CAS program in Chemical Engineering, BHU (2012-2014)
  - Chairman, Department Advisory Committee (DAC), Department of Chemical Engineering at MIT Academy of Engineering, Alandi, Pune (2014-2016)
  - Member, Vishwakarma Puraskar Committee, Labour Ministry, GOI(2009-12)
  - Life Member, Indian Institute of Chemical Engineers
  - Life Member, Indian Society for Surface Science and Technology
  - Fellow Member, Oil Technologists Association of India
  - Life Member, Asian and Mid-east Institute of Chemists
  - Member, Task Force(MoU), Department of Public Enterprise(2012-13), GOI
  - Coordinator, UGC Networking Resource Centre in Chemical Engineering, ICT(2009-2014)
  - Member, R&D Monitoring Committee for ONGC Institutes(2012-13)
  - Member, Advisory Committee, UGC-DRS program in Chemical Engineering, BITS, Pilani(2012-2014)
  - Member, Planning and Monitoring Board, (ICT) (2012-2016)
  - Member & Coordinator, IQAC, Institute of Chemical Technology(2015-16)
  - HoD, Department of Chemical Engineering, ICT (2009-2012)
  - Institute Coordinator, TEQIP-I (2007-2009)
  - Vice - President , Technological Association (2002-2006)
  - Honorary Secretary, UDCT Alumni Association (2004-2008)
  - Member, DAE-ICT Knowledge Based Engineering Centre, ICT (2002-2008)
  - Member, Editorial Board, Indian Journal of Chemical Technology, NISCAIR(2008-2015), Journal of Biomedical Research(2013-2015)
- PUBLICATIONS (PEER REVIEWED) SO FAR: 164**
- PATENTS : 11**
- CONFERENCE PROCEEDINGS/PAPERS: 70**
- SEMINARS/LECTURES/ ORATIONS DELIVERED : 230**
- PH.D.S AWARDED AS SINGLE/ CO-GUIDE: 37**
- MASTERS AWARDED AS SINGLE/ CO-GUIDE: 75**
- POST DOCTORAL FELLOWS SUPERVISED: 02**
- H-INDEX: 28 CITATIONS: 2557**
- SUBJECTS TAUGHT DURING 2016-17**
- Advanced Separation Processes, Process Engineering
- SPECIFIC RESEARCH INTERESTS**
- Biodiesel and Thermochemical conversions of Biomass, Process Intensification by Microwave, Soft Condensed Matter, Reactive Adsorptive Separations and Molecular Design of Functionalized Polymers, Interfacial Science and Engineering, Clean Technology and Organic Synthesis in Aqueous Solutions, Synthesis of nanoparticles, photochemical reduction of CO<sub>2</sub>
- NUMBER OF RESEARCH STUDENTS CURRENTLY BEING SUPERVISED**
- P.D.F. - 00 RA -  
Ph.D. (Tech.) -10 Ph.D.(Sc) - 06  
M.Tech. -03  
M. Chem. Eng -01

M.Sc - Other (if any)  
Undergraduate Summer  
Fellows (if any) - 01  
Teacher summer Fellows (if  
any) -

### NUMBER OF RESEARCH PUBLICATIONS(2016-17)

NATIONAL  
INTERNATIONAL: 13

(PEER-REVIEWED): 13

CONFERENCE  
PROCEEDING : 1

BOOK CHAPTER: 1

- Continuous cane sugar inversion process using immobilized invertase, AC Koli, VG Gaikar, Journal of Chemical Technology and Biotechnology, 2016
- Process Simulation of Palm Fatty Acid Distillate based Biodiesel Plant using Homogenous and Heterogeneous Catalysts, Parminder Heer, and V G Gaikar, Chemical engineering and technology, 2016, accepted for publication
- Phytosynthesis of Silver Nanoparticles Using Walnut (*Juglansregia*) Bark with Characterization of the Antibacterial Activity against *Streptococcus mutans* ND Thakur, VG Gaikar, D Sen, S Mazumder, Analytical Letters, 2016
- Parametric optimization and modeling of batch extraction process for extraction of betulinic acid from leaves of *VitexNegundo* Linn, SV Taralkar, S Chattopadhyay, VG Gaikar - Separation

Science and Technology, 2016

- Preparation of ZnO/MWCNT/PP composite film and its application as multifunctional protective film, P Upasani, TV Sreekumar, VG Gaikar, N Jha, Polymer Composites, 2016
- Development of polystyrene adsorbents functionalized with heterocyclic ligands for selective adsorption of CO 2 from CH 4 and N 2, PKKS Heer, KM Khot, VG Gaikar, Separation and Purification Technology 158, 212-222, 2016
- Molecular design of a novel ligand for Menshutkin complexation of Bi (iii) from aqueous acidic copper sulfate electrolyte solutions and experimental investigations, JS Arora, VG Gaikar, RSC Advances 6 (46), 39663-39674, 2016
- Molecular Dynamics: A Tool for Undergraduate Engineering Students to Transform Their Understanding of Chemistry at Molecular Level, MB Singh, VG Gaikar, Journal of Engineering Education Transformation, 2016
- Synthesis, characterization and application of  $\gamma$ -MnO<sub>2</sub>/graphene oxide for the selective aerobic oxidation of benzyl alcohols to corresponding carbonyl compounds, MM Kadam, KB Dhopte, N Jha, VG Gaikar, PR Nemade, New Journal of Chemistry, 2016

- Need of Promotion of Innovation in Indian Engineering Institutes, VG Gaikar, The Mind of an Engineer, (Eds.) P. Ghosh and Baldev Raj, INAE, New Delhi, 287-296
- Intrinsic Kinetics of Esterification of Fatty Acids Catalyzed by Supported Ionic Liquid Catalysts, PKKS Heer, DD Chabukswar, VG Gaikar, Chemical Engineering & Technology 38 (8), 1416-1424
- Mathematical model for reactive recovery of invertase by chemical permeabilization of baker's yeast, AC Koli, PB Subhedar, S Pamidipati, VG Gaikar, Journal of Chemical Technology and Biotechnology
- Process Intensification of Upgradation of Crude Oil and Vacuum Residue by Hydrodynamic Cavitation and Microwave Irradiation, KB Ansari, NH Loke, AB Pandit, VG Gaikar, R Sivakumar, R Kumar, S Das, Indian Chemical Engineer, 57(3-4), 256-281, 2016
- Pulse Chromatographic Studies of Adsorption of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub> Using Amine Functionalized Polystyrene Adsorbents, KM Khot, PKKS Heer, RB Biniwale, VG Gaikar Separation Science and Technology 50 (5), 718-728
- Experimental and DFT studies for selective separation of Sb (III) and Sb (V) from mixtures

with Zr (IV)/Co (II) using thiourea grafted polystyrene adsorbent, JS Arora, U Joshi, VG Gaikar, SM Ali, RSC Advances 5 (87), 71393-71401.

#### PATENTS FILED:

International 0 Indian 11

#### SPONSORED PROJECTS:

Government 01 Private 03

#### PROFESSIONAL ACTIVITIES (MEMBERSHIP OF IMPORTANT COMMITTEES):

Director, Aarti Drugs Ltd. (2006-to date)

Director, Bharat Oman Refineries Ltd.(2014- to date)

Chairman, Expert Committee,

Research, Innovation and Technology Transfer, RUSA-SPD, Maharashtra

Member, Sectional Committee (Chem Engg), Indian National Academy of Engineering (INAE) (2015-), New Delhi

Member, TASK Force, Bioenergy Sciences, Department of Biotechnology, Ministry of Science and Technology, GoI.(2014-)

Member, Working group- Innovation Council, Maharashtra State(2015-)

Member, National Program on Carbon Capture, Department of Science and Technology, GoI(2015-)

Member (co-opted), PAC-

SERB, Department of Science and Technology(2015-)

Co-ordinator for TEQIP Component 2.1 Innovation Networking Project

#### MEMBERSHIP OF EDITORIAL BOARDS WITH NAME OF JOURNAL AND AGENCY

Indian Journal of Chemical Technology (IJCT), International Journal of Academic and Scientific Research.

#### SPECIAL AWARDS/ HONOURS / ACCOLADES:

First Vice-Chancellor, Dr.BabasahebAmbedkar Technological University



#### PROFESSOR ARVIND MALLINATH LALI

*B. Chem, M. Chem, Ph.D Tech. (Chem. Eng.)*

Professor (Chemical Engineering) Head, DBT-ICT-Centre for Energy Biosciences

#### SUBJECTS TAUGHT DURING 2016-17:

Downstream processing in biotechnology Advances in adsorptive & chromatographic Separations Bioprocess simulation modeling and bioreactor design, Instrumentation & process control Adsorptive separations, Statistical methods

#### RESEARCH INTERESTS:

Bioenergy, biofuels and biomass to other Chemicals Purification of

proteins, nucleic acids & other biomolecules, natural & synthetic APIs high value organic/inorganic chemicals Continuous chromatography, modeling & Biocatalysis & bio transformations Bioreactor design, mixing & dynamics of solid-liquid fluidized bed Dynamics of gas-solid circulating fluidized bed Process integration & intensification Process development, characterization & scale up

#### NUMBER OF RESEARCH STUDENTS:

Ph.D. (Tech)- 4 Ph.D. Sci.- 15 Integrated Ph.D. – 1 PDF- 1 M. Tech. - 2 M. Chem. Eng.- 2

#### NUMBER OF RESEARCH Publications:

International- 61 (so far) Conference Proceedings- 31 (so far)

Book Chapters- 2 (so far)

#### PATENTS:

International – 55 ( filed), granted-16

National- 34 filed, granted – 1





### **PROFESSOR ANIRUDDHA BHALCHANDRA PANDIT**

Ph.D. (Tech.), Department of Chemical Technology, University of Bombay (1980-1984)

B. Tech. (Chemical Engineering), Institute of Technology, Banaras Hindu University (1975-1980)

Professor in Chemical Engineering

**FELLOWSHIPS/  
MEMBERSHIPS OF PRO-  
FESSIONAL BODIES:** J.C.  
Bose Fellow, F.A.Sc., F.N.A.,  
F.N.A.E., F.N.A.Sc.

**HIGHLIGHTS OF RESEA-  
RCH WORK DONE AND ITS  
IMPACT (MAXIMUM TWO  
SINGLE-SPACED PAGES  
WITH FIGURES/DIAGRAMS  
ETC.):**

Prof. A. B. Pandit can be described as singularly responsible individual who proposed and promoted Hydrodynamic Cavitation based physico-chemical and biological transformations. His first publication in the area of hydrodynamic cavitation for Chemical Transformation was in 1992. He has subsequently published over 120 articles till date in the area of cavitation. He has applied this technique for a variety of applications from laboratory to industrial scale (mg to tonnes/day level). The range of applications include: (a) Biotechnology for intracellular enzyme recovery (b) Chemical Engineering and Technology for sonocrystallization, estrification of variety of compounds and nanoparticle synthesis. Successful technologies have also been developed for a

social cause such as water disinfection for rural masses. A unique blend of theory, modeling, experiments and final implementation has resulted in a successful design and scale-up of cavitation reactors from lab to industrial scale. His insights into the fundamental understanding of Cavitation reactors (termed coined by him) has opened a gamut of possible applications of these reactors. His work in the area of effluent water treatment of biorefractory pollutants mineralization and/or prevention of chemical less biofouling prevention in cooling tower circuits has been path breaking. The technology of Ballast water treatment proposed by him along with (National Institute of Oceanography and National Chemical Laboratory) CSIR labs has been well recognized by International Maritime Organization. This is likely to result into an independent sea water treatment technology testing facility, first time in India.

His current work in hand pump based water disinfection for rural India is revolutionary in nature and will be extremely useful in the developing countries as it has resulted

into a modified hand-pump design giving in excess of 89% disinfection in one pass. His contribution to ICT ENERGY group has resulted into energy efficient processes for cooking, solar steam generation and efficient smokeless Solid Fuel Chullas (Stoves) designs.

He has developed novel designs for a variety of Cavitationally induced chemical, biological and physical transformations unit processes which are in successful commercial operations.

A unique scientific creative approach of using fundamental knowledge, coupled with simple, elegant experiments demonstrating Industrial and Social utility has been the hallmark of Prof. Pandit's contribution to Science and Technology. Prof. Pandit has authored over 333 (as per Scopus) publications, 6 books and over 17 chapters and has 17 patents with over 11416 citations (as per Scopus webmedia) and H-Index 57. He is also on the Editorial board of several International Scientific Journals. He has successfully guided 38 PhD's and 68 Master's students in Engineering and Technology so far.

## RESEARCH PHOTOS:



Figure 1: Anti solvent crystallization setup

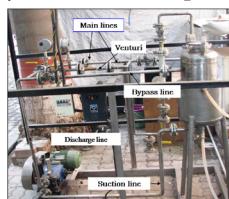


Figure 2: Hydrodynamic cavitation setup



Figure 3: Bio gas generation from food waste

**PUBLICATIONS (PEER REVIEWED) SO FAR :** 333 (as per Scopus)

**PATENTS:**17

**CONFERENCE PROCEEDINGS/PAPERS:**170

**SEMINARS/LECTURES/ ORATIONS DELIVERED:** 200

**PH.D.S AWARDED AS SINGLE/ CO-GUIDE:** 38

**MASTERS AWARDED AS SINGLE/ CO-GUIDE :** 68

**POST DOCTORAL FELLOWS SUPERVISED:**

## AWARDS/HONORS:

National - 31, International -01

**H-INDEX :** 57 ( as per Scopus)

**CITATIONS:** 11416 (as per Scopus)

## SUBJECTS TAUGHT DURING 2016-17:

Environmental Engineering and pollution control  
Chemical Project Economics  
Design of Multiphase Reactors

## SPECIFIC RESEARCH INTERESTS:

Physical and Chemical Processing applications of Cavitation phenomena, Sonochemistry, Ballast Water Treatment, Mixing in Mechanically agitated contactors: Experimental and CFD Investigations, Modeling of Stoves, Use of non-conventional energy sources, Synthesis of Nanomaterials  
Biotechnology: Protein modification, Cell disruption and Microbial fuel cell.

## NUMBER OF RESEARCH STUDENTS CURRENTLY BEING SUPERVISED :

P.D.F. - RA -01  
Ph.D. (Tech.) -20 Ph.D.(Sc) - 04

M.Tech. -02 M. Chem. Eng -04

M.Sc - 00 Other (if any)  
Undergraduate Summer Fellows (if any) – 08  
Teacher summer Fellows (if any) -

## RESEARCH PUBLICATIONS:

National - International - 21 (Peer-reviewed) -  
Conference proceeding - Book

**PATENTS:** International - Indian - 1

## SPONSORED PROJECTS :

Government- 3

Private- 4

## PROFESSIONAL ACTIVITIES:

Dean (SA and HRD) and ICD Chairman, HyCa Technology Pvt. Ltd., Mumbai  
President, Land Research Institute (LRI)- Charitable Organization involved in Land Mass and Energy Conservation.

Member, Board of Governors and Past President, UDCT Alumni Association

## MEMBERSHIP OF IMPORTANT COMMITTEES:

Member of DST-FIST, UGC-SAP, DST ChemEngg PAC, DST MOFPI PAC, Adjunct Professor at BITs Goa Campus

## MEMBERSHIP OF EDITORIAL BOARDS WITH NAME OF JOURNAL AND AGENCY:

Ultrasonics Sonochemistry (USS), Chemical and Biochemical Engineering, Chemical Engineering and Processing: Process Intensification, Industrial Engineering and Chemistry, Journal of Science Assam, Journal of Mustard Research Promotion Council.

## SPECIAL AWARDS/ HONOURS / ACCOLADES :

- Fellow, The World Academy of Sciences (TWAS)
- DST-Lockheed Martin-Tata Trusts, India Innovation Growth Programme (IIGP)2.0 Awards 2017



**PROFESSOR (DR.) ANAND VINAYAK PATWARDHAN**

B. Chem. Eng. (UDCT, Mumbai, 1983), M. Chem. Eng. (UDCT, Mumbai, 1985), Ph.D. (Tech.) in Chem. Eng. (UDCT, Mumbai, 1988)

Professor in Chemical Engineering

**FELLOWSHIPS / MEMBERSHIPS OF PROFESSIONAL BODIES:** Life member of Indian Institute of Chemical Engineers

**HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT (MAXIMUM TWO SINGLE-SPACED PAGES WITH FIGURES/DIAGRAMS ETC.):**

**Membrane separation (separation and recovery of organic chemicals and metals from organic and aqueous streams; pollution control; development of ceramic membranes)**

- Separation of various metal ions from aqueous streams using supported liquid membrane
- Separation using hollow fibre membrane as well as flat sheet membrane
- Separation of metal ions like U, Nd, Pb, Co, Zn, Sr, Cs, and their mass transport parameters
- Separation of organic acids from aqueous stream using the flat sheet supported liquid membranes
- Scale-up from laboratory scale to industrial scale equipment

- Removal of sulphur compounds from various petroleum fractions
- Mathematical modelling of membrane separation phenomena
- Development of ceramic membranes for industrial applications

**Green Technology (ionic liquids for solvent extraction and reactions; value-added chemicals from non-edible oils; greener organic chemical process development)**

- Enantioselective synthesis, kinetic resolutions of racemic mixtures, chiral molecular recognition, group transfer reactions using chiral auxiliaries / catalyst, synthetic organic chemistry for pharmaceutical aspects.
- Multiphase catalysis relies on the transfer of organic substrates into the catalyst phase or on catalysis at the phase boundary. Most organic substrates do not have sufficient solubility in the catalyst phase to give practical reaction rates in catalytic applications. The catalytic / solvent role of ionic liquids in such cases is being explored for some industrially relevant

reactions.

- Epoxidation of edible and non-edible oils for industrially useful chemicals.
- Separation of C7 and C8 liquid mixtures with ionic liquids as extracting solvents.

**Bioprocess Technology (synthesis of chemicals and microbial colorants / pigments)**

- Development of viable and efficient bioconversion process for the production of the L-ascorbic acid from inexpensive starting materials, such as, glucose.
- Development of analytical method for simultaneous quantitative estimation of L-ascorbic acid and 2- keto-L-gulonic acid.
- Effect of precursor addition on the production of L-ascorbic acid during fermentation.
- Effect of intracellular enzyme inhibitor on the yield of L-ascorbic acid.
- Production of natural colours or pigments by screening various microbes producing natural pigments / colours, and the development of a fermentation process for the same as the use of

fermentation processes possess a number of advantages when compared to vegetable sources, including the possibility of continuous cultivation, and the rapid multiplication of microorganisms.

**PUBLICATIONS (PEER REVIEWED) SO FAR:** 59

**PATENTS:** 1

**TOTAL NO. CONFERENCE PROCEEDINGS/PAPERS :** 58

**SEMINARS/LECTURES/ ORATIONS DELIVERED :** 22

**PH.D.S AWARDED AS SINGLE/ CO-GUIDE:** 13 COMPLETED; 6 on going

**MASTERS AWARDED AS SINGLE/ CO-GUIDE:** 44 completed; 2 on going

**H-INDEX :** 18

**CITATIONS:** 1259

**SUBJECTS TAUGHT DURING 2016-17:**

- Separation Processes (CET-1402: T. Y. B. Chem. Eng.)
- Transport Phenomena (CET-1105: S. Y. B. Tech.)

- Process Engineering (CET-1505: Final Y. B. Chem. Eng.)
- Process Modelling & Simulation (CET-2753: F. Y. M. Chem. Eng.)

#### SPECIFIC RESEARCH INTERESTS :

- Membrane separation (separation and recovery of organic chemicals and metals from organic and aqueous streams; pollution control; development of ceramic membranes for pollution control and recovery of valuable chemicals)
- Green Technology (ionic liquids for solvent extraction and reactions; value-added chemicals from non-edible oils; greener organic chemical process development)

#### NUMBER OF RESEARCH STUDENTS CURRENTLY BEING SUPERVISED :

P.D.F. - RA -  
 Ph.D. (Tech.) - 4  
 Ph.D.(Sc) - 1  
 M.Tech.-  
 M. Chem.Eng- 2

M.Sc - Other (if any)  
 Undergraduate Summer Fellows (if any) -  
 Teacher summer Fellows (if any) -

#### RESEARCH PUBLICATIONS:

National -2 International-1 (Peer-reviewed) -3

Conference proceeding - Books(if any) -

#### NUMBER OF PATENTS:

International - Indian-

#### NUMBER OF SPONSORED PROJECTS :

Government- 2 Private-

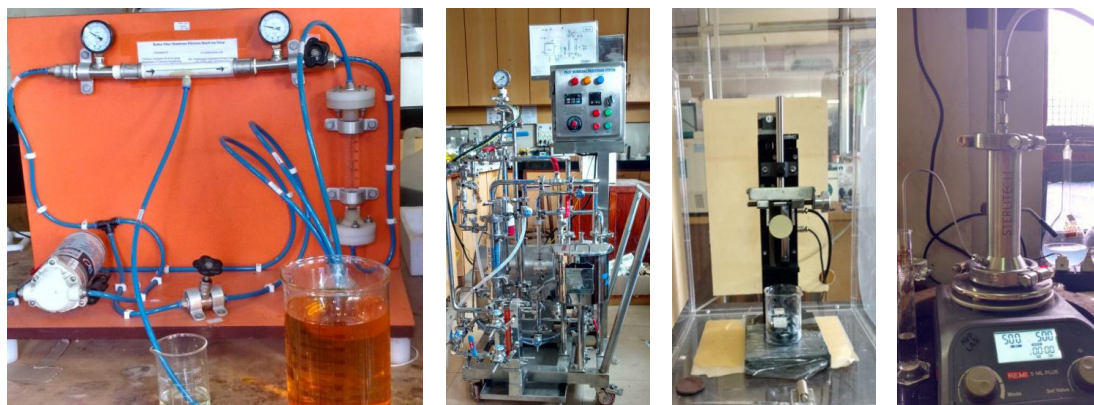
#### PROFESSIONAL ACTIVITIES:

- a) Membership of important Committees:
- Member of the experts' panel formed by the DSIR (New Delhi) for accreditation of Research and Development units of various industries
- Member of the reviewers' panel of Global Initiative of Academic Networks (GIAN), IIT Kharagpur

#### SPECIAL AWARDS/ HONOURS / ACCOLADES :

Best Teacher Award (elected by S. Y. B. Tech. all branches)

#### PHOTOGRAPH (LABORATORY)-







## PROFESSOR ASHWIN W. PATWARDHAN

Ph.D.

Professor in Chemical Engineering

### FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES:

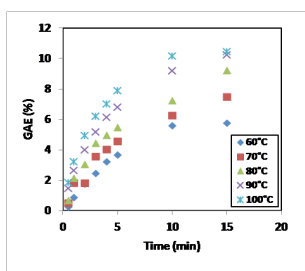
Fellow Maharashtra Academy  
of Sciences

### HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT (MAXIMUM TWO SINGLE-SPACED PAGES WITH FIGURES/DIAGRAMS ETC.):

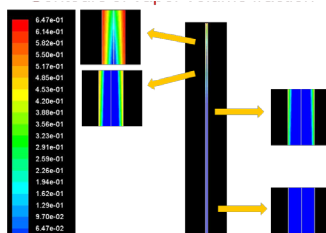
- **Kinetics of Tea Polyphenol Infusion:**

Tea contains polyphenols and methyl xanthines, along with other compounds like tannic acid, thearubigins and theaflavins, etc. The objective of the research work is to improve the infusion kinetics of conventionally used tea bags. Concerning this, swelling and infusion kinetics of tea bags were determined for various parameters. Effect of temperature, particle size, bag dipping and size of tea bag was determined for tea bags containing CTC black tea. An increment of 81% was observed in infusion profile of CTC black tea as brewing temperature was increased over 60-100 °C. It was observed that reduction in particle size and increment in temperature, dipping

frequency and size of tea bag led to improvement in infusion profiles of tea bags.



- **Modeling of Two Phase Flow Instabilities in Vertical Tube Boiling Evaporators**



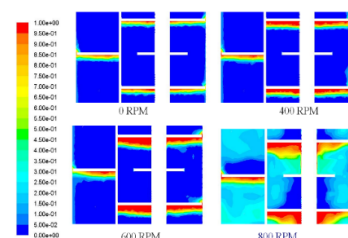
Two phase flow boiling in vertical tube mainly occurs in steam generator in nuclear power plants, thermal power plants, electronic cooling systems etc. Subcooled boiling is important phenomenon as it deals with high heat transfer coefficient and non-uniform vapor distribution. In order to predict subcooled boiling

flow behavior, effect of boiling parameters models, Non-drag forces, effect of turbulence models on axial and radial distribution of vapor fraction and liquid temperature has been studied.

Based on comparison study, CFD model has been developed. Applicability of developed CFD model has been checked against experimental studies. It was observed that developed CFD model has potential to predict two phase pressure drop in vertical tube.

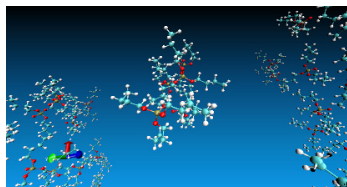
### Raosaheb Ananda Farakte

- **CFD simulation of lab scale Asymmetric Rotating disc contactor (ARDC):**



Asymmetric rotating disc contactor (ARDC) is the modified version of rotating disc contactor (RDC), which is widely used for liquid-liquid extraction.

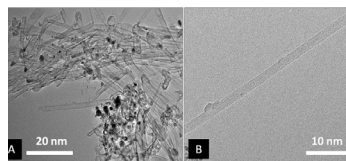
ARDC provides better stage wise contact than RDC by reducing back mixing. For efficient design and scale-up, it is necessary to study the effect of various geometry parameters and operating conditions. In the present work, computational fluid dynamics (CFD) simulations were carried out to study hydrodynamics of ARDC. The results of CFD were validated using experiments. The hold-up of dispersed phase, effect of discs and impellers (disc with 4 blades at 45°) on flow pattern and hold-up in ARDC was studied. An increase in rotation speed resulted in an increase in hold-up. Substantial increase in hold up after 400 rpm is attributed to the strong agitation effects.



- **Thermodynamics of extraction systems.**

The study of Liquid-liquid extraction (LLE) processes at molecular level is an important aspect. Reliable molecular level description of extractant diluent and solute is essential for understanding LLE. One way to study such systems is molecular dynamic simulations (MD). Tributyl phosphate (TBP) and di-(2-ethylhexyl) phosphoric acid (D2EHPA) are versatile extractants. These extractants

are usually deployed with inert diluents such as kerosene, paraffin etc. The objective of the present work was to quantify extractant solute interactions using free energy calculations in case of lithium extraction from aqueous stream using TBP and D2EHPA. MD simulations were performed using GROMACS. Pure component properties of TBP, D2EHPA and dodecane were simulated. The physical properties were found to be in good agreement with the experimental properties. Figure: Snapshot of tributyl phosphate (TBP) aggregate during MD simulation in dodecane. (Dodecane not shown for clarity)



- **Synthesis of single walled carbon nanotubes: Kinetics and Reaction mechanism:**

Single walled carbon nanotubes (SWCNTs) have been synthesized by thermocatalytic decomposition of methane by using ferrocene as the catalyst at atmospheric pressure. A floating catalyst chemical vapour deposition reactor was employed to investigate the kinetics. The effects of temperature of synthesis (800 - 1000 °C), partial pressure (2 to 40 kPa) of reactant gas and catalyst concentration (0.2 to 4.6

mol m<sup>-3</sup>) on the rate of decomposition of methane have been studied. A reaction mechanism has been proposed and irreversible dissociative adsorption of methane on the catalytic active site followed by the irreversible decomposition of the adsorbed methyl group is found to be the rate controlling step. The synthesized SWCNTs exhibits high crystallinity. Figure: (A) TEM image of bundled SWCNTs produced using methane, ferrocene and sulphur as carbon source, catalyst and promoter respectively. (B) TEM image of individual SWCNT.

- **Hydrodynamics of multiphase flow in pipes**

The prediction capability of two-fluid model for gas liquid dispersed two phase flow depends on the accuracy of the interfacial forces. The interfacial forces such as drag, lift, wall lubrication and turbulent dispersion play an important role in the prediction of radial distribution of gas void fraction. With gas liquid dispersed two phase flow in a vertical pipe, wall peak as well as core peak phenomena is observed. CFD model has been developed which is well capable of prediction of radial distribution of gas void fraction and liquid and gas velocity for low and high (Re<sub>b</sub>) cases. Figure: Contour plots of radial distribution of gas void fraction (a-b) and comparison of experimental and simulated results of

radial distribution of gas void fraction (c-d).

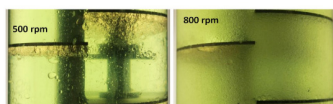
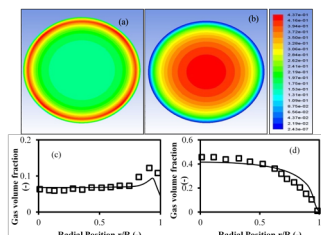
- **Synthesis of doped Carbon Nanotubes**

Boron doped carbon nanotubes were synthesized using chemical vapour deposition, with acetylene as a carbon source and boric acid as boron source. The important parameters determining the rate of reaction included, temperature, partial pressure, flow rate and catalyst concentration. The temperature variation (650oC to 950oC) showed existence of different mechanisms with different activation energies. The flow rate studies depicted that the flow rates above 2400 sccm and 2.4 g catalyst weight were responsible for eliminating the mass transfer diffusion limitations. It was found that the adsorption of the species was a rate determining steps. BCNTs produced did not have a well-defined morphology and the boron content in the B-CNT lattices was found to be between 6-7 percent.

- **CFD simulations of Asymmetric rotating disc contactors**

Phosphoric acid is an important secondary source of uranium. In the present work, hydrodynamics characteristics and mass transfer performance of a multi-impeller column for extraction of uranium from phosphoric acid was studied. Effect of operating parameters like impeller speed, phase velocities

on drop size and size distribution, hold up and, flooding velocities and mass transfer coefficient were evaluated. Drop size distribution was strongly affected by impeller speed. It was observed that increase in impeller speed and continuous and dispersed phase velocities leads to enhancement in hold up of dispersed phase as seen in figure. The experiments showed that flooding occurred in bottom stages of the column. Almost 100 % extraction of uranium was observed at impeller speed of 250 rpm. The height of mass transfer unit obtained at 250 rpm was 0.13 m at  $V_c = V_d = 1$  mm/s, which indicates the high performance of multi-impeller column for extraction of uranium.



**PUBLICATIONS (PEER REVIEWED) SO FAR:** 94

**PATENTS:**

**CONFERENCE PROCEEDINGS/PAPERS:** 30

**SEMINARS/LECTURES/ ORATIONS DELIVERED:** 51

**PH.D.S AWARDED AS**

**SINGLE/ CO-GUIDE:** 16

**MASTERS AWARDED AS SINGLE/ CO-GUIDE:** 45

**POST DOCTORAL FELLOWS SUPERVISED:**

**AWARDS/HONORS**

National - 10

International - 0

**H-INDEX :** 23

**CITATIONS:** 1531

**SUBJECTS TAUGHT DURING 2016-17:**

Momentum and Mass Transfer, Advanced Reaction Engineering, Material and Energy Balance Computations, Advanced Separation Processes

**SPECIFIC RESEARCH INTERESTS:**

Transport Phenomena, Computational Fluid Dynamics, Membrane Separations, Liquid – Liquid extraction, Thermal Hydraulics

**NUMBER OF RESEARCH STUDENTS CURRENTLY BEING SUPERVISED :**

P.D.F. - RA -

Ph.D. (Tech.) -15

Ph.D.(Sc) - M.Tech. -

M. Chem. Eng-2

M.Sc - Other (if any)

Undergraduate Summer Fellows (if any) - 3

Teacher summer Fellows (if any) -

**RESEARCH PUBLICATIONS:**

National-

International- 5

(Peer-reviewed)-

Conference proceeding-

Books (if any)-

**PATENTS:**

International - 0

Indian 0

**SPONSORED PROJECTS:**

Government- 4 Private- 1

### PROFESSIONAL ACTIVITIES:

- a) Membership of important Committees:
- (i) External expert, Selection process for faculty at Ahmedabad University, July 2016

- (ii) Member, Board of Examiners for Ph. D. Thesis, IIT Kharagpur, December 2016
- (iii) Member Expert Panel for Revision of AICTE Model Curricula, April 2017
- b) Membership of Editorial

Boards with name of journal and agency:

**SPECIAL AWARDS/ HONOURS / ACCOLADES:**  
Prof. M. M. Sharma Award for Science and Technology, Marathi Vidnyan Parishad, Dec. 2016.



### PROFESSOR VIRENDRA K. RATHOD

*Ph.D. (Tech), Institute of Chemical Technology, Mumbai*  
M.Chem, Institute of Chemical Technology, Mumbai  
B.Tech, Nagpur  
Professor in Chemical Engineering

### GENERAL RESEARCH INTEREST AND EXPERTISE :

Separation Processes, Process Intensification, Waste Treatment, Enzyme Modification and Treatment, Bio-separation, Nuclear reprocessing, Extraction of natural ingredients, Nanoparticles preparation, Biodiesel Manufacturing, Enzymatic Catalyzed Reactions

### FELLOWSHIPS OF NATIONAL AND INTERNATIONAL ACADEMIES OF SCIENCE OR ENGINEERING (IF ANY):

FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES:

PUBLICATIONS (PEER REVIEWED) SO FAR: 110

PATENTS: 01

### CONFERENCE PROCEEDINGS/PAPERS:

SEMINARS/LECTURES/ ORATIONS DELIVERED: -

PH.D.S AWARDED AS SINGLE: 08

MASTERS AWARDED AS SINGLE: 69

POST DOCTORAL FELLOWS SUPERVISED: -

### AWARDS/HONORS:

National - 01  
International - 57

H-INDEX: 10  
CITATIONS:

HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT (MAXIMUM TWO SINGLE-SPACED PAGES WITH FIGURES/DIAGRAMS ETC.) :

**Studies in extraction and purification of bioactive**

### molecule from natural sources

The interest in traditional medicines is growing substantially since several modern drugs are banned due to their increased side effects apart from being expensive. India has a rich array of registered and widely popular medicinal plants. Mangiferin is a major component of mango leaves and is an important natural drug with wide applications in pharmaceutical and other related industries as mentioned by Sato et al. It shows antioxidant, antitumor and antiviral properties. The present work will involve use of novel extraction processes such as ultrasound assisted extraction (UAE), microwave assisted extraction (MAE) and adsorptive purification of the natural product. In (UAE) . Effect of various extraction process parameters such as



extraction solvent, extraction time, temp, frequency on extraction yield will be studied. Most significant parameters would be find out and statistical optimization of most significant process parameters to get maximum yield. This study also aims towards understanding the kinetics and to develop the model for this extraction process under different parameters to predict extraction rate constant, initial extraction rate and equilibrium concentration. Final purification is carried out by adsorption chromatography.

### **Studies in enzyme immobilization**

Enzyme immobilization onto solid carrier is one of the effective techniques which not only stabilizes enzymes under operational conditions but also allows easy recovery and reusability for multiple cycles. Generally, immobilization of enzyme on the carrier involves synthesis of functionalized carrier and covalent cross-linking of enzyme on its surface. Over the past decade, a number of nano-carriers have been prepared and used as a support for immobilization of enzyme. Among different types of carriers, magnetic nanoparticles (MNPs) are significantly used as a support due to their unique characteristics such as their tailored surface chemistry, unique physicochemical properties, biocompatibility, biodegradability. Also, magnetic nanoparticles allow easy, quick and efficient separation of enzyme from the reaction mixture by using external magnet. Pectinase was immobilized

onto chitosan magnetic nanoparticles (CMNPs) by dextran polyaldehyde as a macromolecular cross-linking agent. The parameters like cross-linking concentration, time and CMNPs to enzyme ratio were optimized. Further, prepared magnetic pectinase nanobiocatalyst was characterized by FT-IR and XRD. The thermal kinetic studies for immobilized pectinase showed two folds improved thermal stability in the range as compared to free form. The  $V_{max}$  and  $K_m$  values of immobilized pectinase were found to be nearly equal to native form which indicated that conformational flexibility of pectinase was retained even after immobilization. Finally, magnetic pectinase nanobiocatalyst was employed for apple juice clarification which showed turbidity reduction upto 74% after 150 min treatment.

### **Hydrodynamics and Mass Transfer Studies in Pulsed Sieve-plate Extraction Column and Mixer-settler**

The complex behavior of the hydrodynamics and mass transfer performance, leads to difficulties in the design and performance of pulsed sieve plate extraction column. Dynamics and mass transfer in a liquid-liquid extraction column are essentially determined by the behavior of the dispersed phase. It seems obvious that the changes in the characteristics such as hold-up, drop size, axial dispersion, flooding in the column have to be considered in order to describe conveniently the hydrodynamics of the column. Many empirical

models for predicting the hydrodynamics in a liquid-liquid extraction column has been proposed and reviewed by various investigators.

The research work aims at the experimental study of the effect of operating and design variables for elucidation of hydrodynamics of the pulse sieve plate extraction column using various types of plate and different column configuration and the description of a mathematical model and the different algorithms which would be developed for the simulation of extraction column. The Phase Reversal studies have been carried out in a Pulsed Sieve Plate extraction column 0.152 m in diameter.

Remotely operated Combined Air-lift Mixer-settler Unit will be studied in detail for its easiness of operation. Mixer-Settler provide good mixing and reasonably good phase separation performance but rather large hold-ups. Each mixer-settler unit provides a single stage of extraction. Mixer-settlers are used when a process requires longer residence times and when the solutions are easily separated by gravity. This research deals with the comparison of performance of the pulsed sieve plate extraction column with the mixer-settler and their effect on the column efficiency.

### **Studies in Water Treatment Technologies**

Membrane technique is being used and well commercialized for the removal of fluoride from the ground water.

Presently, membrane units are in operation in villages at domestic level, which generates fluoride free water and concentrated fluoride stream. Hence, it is proposed to carry out the comprehensive study on the removal of fluoride from concentrated retentate stream overcoming the drawback of membrane technology. Design of a complete process for purification of drinking water including calcium, magnesium and nitrate will be carried out as well. The various parameters i.e. concentration of lime, concentration of reactants, pH and contamination and effect of other ions present in feed which influences this separation are in progress. Based on optimized parameters of membrane filtration and precipitation techniques, a process will be designed which will also be tested by experimentation. The experimental data obtained after above mentioned experimentation will be analyzed on Ion Selective Meter and Particle Size Analyzer to develop a complete process for water treatment.

### **Studies in production and purification of a proteolytic enzyme**

Among the treatments of cardiovascular diseases, fibrinolytic agent is promising and highly effective therapy. In this proposed work, main emphasize is given to the production and purification of fibrinolytic enzyme from the bacterial culture. One factor at a time method was employed in the production of enzyme in submerged fermentation. In Bioreactor scale, effect of

different operating parameters will be evaluated on the production of enzyme. Different purification technique will be used to achieve higher purity product in minimum time period and with less number of steps. Finally, molecular characterization of enzyme will be carried out to determine its molecular weight and other properties.

### **Hydrodynamics of Extraction Systems**

Optimization of the hydrodynamic characteristics such as drop size, dispersed phase hold-up, flooding and axial dispersion in pulsed sieve plate column for water-kerosene system has been done with 0.76m diameter and 1m long pulsed sieve plate column. The optimized geometrical parameters are perforation diameter of 0.003m, plate spacing of 0.05m and fractional free area of 0.2. The optimized operating parameters are throughput of 0.013m/s at phase ratio (A/O) of 1:1 and pulsed velocity of 0.025m/s. At the optimized geometrical and operating parameters, Sauter mean Diameter ( $d_{32}$ ) attained was 0.0013m, dispersed phase hold-up ( $\phi$ ) obtained was 0.18 with throughput ( $V_{cf} + V_{df}$ ) of 0.013m/s. Continuous phase axial dispersion coefficient (E) was  $6.56 \times 10^{-4}$  m<sup>2</sup>/s. The design of pulsed sieve plate column in terms of diameter and height has been done. The equilibrium data is generated for 0.3M HNO<sub>3</sub>-TBP-dodecane system and the mass transfer study have been conducted for the removal of dissolved TBP from aqueous 0.3M HNO<sub>3</sub> stream.

NTU required was 1.52 and the HTU of 0.63 for optimized flow rate and other geometrical and operating conditions was calculated from the experimental results. For removal of dissolved TBP from 202ppm to 5ppm, the NTU required was 3.7 and HTU was constant i.e. 0.63m at constant set of geometrical as well as operating conditions. Thus the desired height of the column would be 2.3m. From experimental throughput data, the column diameter required for 100 kg/hr of 0.3M HNO<sub>3</sub> feed was 0.085m.

### **Studies in liquid-liquid systems**

Tri n-butyl phosphate (TBP) is the most frequently used solvent in liquid - liquid extraction for nuclear fuel reprocessing. But contact between TBP and aqueous solutions of nitric acid and/or heavy metal nitrates salts at elevated temperature can lead to violent reactions. Thus, there is a need for making development in solvent extraction process for removal of TBP from aqueous waste, so that it can be easily disposed off without creating any explosion havoc. The proposed research work involves studying the solubility of TBP in different concentrations of nitric acid under different conditions. The generation of equilibrium data for different concentrations of TBP and nitric acid will be helpful in calculating the number of theoretical stages in designing of the extraction column. This will be useful for maximum removal of TBP from the aqueous waste. Extraction of dissolved TBP in acidic aqueous solution was done by Normal

Paraffin Hydrocarbon (NPH) solvent using air ejector mixer-settler. Analysis of very low level TBP in both organic and aqueous phase was done. TBP dissolved in organic media like dodecane

and NPH was analyzed on Gas Chromatograph (GC) while that dissolved in aqueous media was analyzed on High Performance Liquid Chromatograph (HPLC). Physical properties like viscosity,

density and interfacial tension of TBP-NPH-Nitric acid system were also studied.

#### TEN BEST / REPRESENTATIVE PUBLICATIONS / PATENTS :

Authors (in order)	Journal	Volume	Pages	Impact Factor
Self-assembled organic-inorganic hybrid glucoamylase nanoflowers with enhanced activity and stability, Shamraja S Nadar, Sarita D Gawas, Virendra K Rathod	International Journal of Biological Macromolecules	92	660-669	3.2
Three phase partitioning for extraction of oil: A review, Panadare, D.C., Rathod, V.K.	Trends in Food Science & Technology	48	145-151	5.1
Acoustic cavitation promoted lipase catalyzed synthesis of isobutyl propionate in solvent free system: Optimization and kinetic studies Kajal S. Jaiswal, Virendra K. Rathod	Ultrasonics Sonochemistry	In press	4812-4820	4.8
Mapping study of an ultrasonic bath for the extraction of andrographolide from <i>Andrographis paniculata</i> using ultrasound	Industrial Crops and Products	66	312-318	3.58
Ultrasound assisted enzyme catalyzed hydrolysis of waste cooking oil under solvent free condition, Waghmare, G.V., Rathod, V.K.	Ultrasonics Sonochemistry	66		4.32
Persulfate assisted photo-catalytic abatement of cetirizine hydrochloride from aqueous waste: Biodegradability and toxicity analysis, Gadipelly, C., Rathod, V.K., Marathe, K.V.	Source of the Document Journal of Molecular Catalysis A: Chemical	414	116-121	3.61
Ultrasound assisted synthesis of citronellol laurate by using Novozym 435, Galgali A., Gawas, S.D., Rathod, V.K.	CatalysisToday	Inpress		4.636
Ultrasound assisted Laccase catalyzed degradation of Ciprofloxacin hydrochloride, Sutar, R.S., Rathod, V.K.	Journal of Industrial and Engineering Chemistry	31	276-282	3.51
Enhancement in biodiesel production using waste cooking oil and calcium diglyceroxide as a heterogeneous catalyst in presence of ultrasound, Gupta, A.R., Yadav, S.V., Rathod, V.K.	Fuel	158	800-806	3.407

Authors (in order)	Journal	Volume	Pages	Impact Factor
Lipase catalysed synthesis of cetyl oleate using ultrasound: Optimization and kinetic studies, Khan, N. R., Jadhav, S. V., Rathod, V.K.	Ultrasonics Sonochemistry	27	522-529	4.32

#### SUBJECTS TAUGHT

#### DURING 2016-17:

Heat Transfer, Advanced Heat transfer, Transport phenomena & separation process, advanced processes in perfume & flavour technology, Advance Multiphase engineering, Chemical Reaction Engineering

#### SPECIFIC RESEARCH

#### INTERESTS:

Enzymatic Catalyzed Reactions, Separation Processes, Process Intensification, Waste Treatment, Enzyme Modification and Treatment,

Bio-separation, Nuclear reprocessing, Extraction of natural ingredients, Biodiesel Manufacture

#### NUMBER OF RESEARCH STUDENTS CURRENTLY BEING SUPERVISED :

P.D.F - none RA - 4  
Ph.D. (Tech.) - 21  
Ph.D.(Sc) - 9  
M.Tech. - 7  
M. Chem. Eng - 1  
M.Sc - Other (if any)  
Undergraduate Summer Fellows (if any) -  
Teacher summer Fellows (if

any) -

#### NUMBER OF RESEARCH PUBLICATIONS:

National- 1  
International- 32  
(Peer-reviewed)-  
Conference proceeding -  
Books(if any)- 2

#### NUMBER OF PATENTS:

International- 00 Indian- 01

#### NUMBER OF SPONSORED PROJECTS:

Government- 02  
Private- 01



#### DR. PARAG R. GOGATE

*B. Chem. Eng., M. Chem. Eng., Ph.D. (Tech.)*

Associate Professor in Chemical Engineering

#### PROFILE AND ACCOMPLISHMENTS SO FAR

#### FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES:

- Member, Indian Institute of Chemical Engineers, 2003
- Young Associate of Maharashtra Academy of Sciences, 2007
- Member, National Academy

of Sciences, Allahabad, 2009

- Young Associate, Indian Academy of Sciences, Bangalore, 2009-2012
- Member, Indian Society for Technical Education, 2011
- Young Associate, Indian National Academy of Engineering, 2012
- Chartered Member, Institution of Chemical

Engineers, UK, 2013

- Fellow, Maharashtra Academy of Sciences, 2014
- Member, Board of Governors & Honorary Secretary, UDCT Alumni Association, 2015-2017

#### HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT (MAXIMUM TWO SINGLE-



## SPACED PAGES WITH FIGURES/DIAGRAMS ETC.):

Dr. Gogate has developed engineering design and scale up strategies for cavitational reactors based on the methodical analysis of the bubble behaviour and its implications on the cavitational intensity. Cavitational reactors are based on the key concepts of process intensification including the use of newer energy sources such as ultrasound and fluid energy. The theoretical aspects have considered the different approaches to understand the non-linear bubble dynamics also considering the chemical reactions occurring inside the bubble. Also based on fundamental analysis, a scheme has been developed to predict the cavitational intensity in the reactor which can aid in obtaining optimum design for cavitational reactors. The work has resulted into establishing the optimum set of design and operating parameters for maximizing the cavitational effects for acoustic and hydrodynamic cavitation reactors and also formed the basis for new designs which can be functional at commercial scale operations.

The fundamental analysis has also been successfully transformed into pilot scale designs which are significantly more energy efficient as compared to the conventional designs. For the large scale designs, Dr. Gogate has also performed the methodological analysis of the cavitational activity distributions based on the theoretical simulations and experimental mapping measurements to establish the

enhanced activity. The successful design and application of pilot scale reactors operating on the basis of multiple frequency multiple transducer ultrasound irradiation can be considered as a significant achievement as this was the first such depiction in India and one of the few worldwide. The work has also allowed commercial scale installations for cavitational reactors which has been lacking.

The main focus of the recent work has been on utilization of newer resources of energy for waste minimization, increasing the throughputs and converting the waste resources into useful products based on the application of the basic insights developed earlier. The process intensification studies with different industrially important applications such as chemical synthesis, wastewater treatment, crystallization and emulsification have clearly established the utility of cavitational reactors and have opened up many new areas of applications. The innovative work on using combined oxidation schemes for wastewater treatment/water disinfection should help in achieving the dreams of a greener environment and also sustainable processing. It has been established and is under demonstration that new designs of cavitational reactors give about 50 to 400% intensification in the processing rates as compared to the conventional designs. The work on synthesis of nanomaterials has led to establishing the procedures for obtaining materials with desired characteristics especially in

terms of the particle size and one patent application has been filed on this work with around 25 publications in international journals of high impact factor.

Dr. Gogate has also put forward and successfully established the utility of hydrodynamic cavitation reactors with much higher energy efficiencies as compared to sonochemical reactors. Dr. Gogate was one of the key researchers to start the research in this area, which has now been successfully implemented worldwide. Strategies for intensification of the cavitational activity based on the basic research work have also been successfully established with an objective of reducing the processing costs as well as enhancing the applicability of the cavitation phenomena. The mechanism of synergy for the combinatorial techniques of oxidation has been conclusively identified and this should help in achieving the intensification goals by using variable operation of the cavitational reactors especially for the wastewater treatment applications.

The fundamental work on intensification of enzyme activity due to the use of ultrasound has revealed that the application of ultrasound under optimized conditions results in about two fold increase in the activity of enzyme. This can be a major breakthrough in the area of enzymatic reactions which have been criticized for slow rates despite being Green processes with much higher selectivity. Thermodynamic studies with various enzymes indicated that there is a favorable change in the

thermodynamic parameters due to the changes in the enzyme structure leading to enhanced reaction rates.

The research work has translated into commercial scale applications for two notable applications of improved crystallization (pharmaceutical industry applications) and wastewater treatment (oil and gas industry for recycle of water). The research work and the developed engineering strategies are expected to have a significant impact on the other applications of cavitation reactors in a variety of areas such as specialty chemical synthesis, Biotechnology, Polymer chemistry, extraction of natural products, atomization, enhanced oil recovery, textile industry for enhancing the efficacy of dyeing technique etc. with immense scope for commercial exploitation.

Dr. Gogate has been consultant to many industrial organizations including Ecosphere Technologies in USA in the area of Process Intensification, Process Improvement, Scale up and Design of process equipments. Dr. Gogate has completed so far 10 projects successfully and many companies have renewed the contracts showing the level of satisfaction. Dr. Gogate, in collaboration with Ecosphere Technologies, USA, has recently developed a hybrid advanced oxidation reactor which intensifies the treatment process by 5–20 times as compared to the use of individual approaches depending on the application in question. The Ozonix® reactor has been successfully used for

processing of the recycled fluids at commercial sites on over 1200 oil and natural gas wells during hydraulic operations around the United States. Dr. Gogate is currently working on sponsored research projects worth over 1 Cr from DST in the field of intensification of chemical processing applications using cavitation reactors. Dr. Gogate is also working on collaborative projects with scientists from Portugal and Brazil.

The significance and exceptional quality of the research work is aptly reflected by the fact that the number of citations is remarkably high at around 8800 with an h-index of 52 as per scopus and over 11,900 with h-index of above 58 as per google scholar. Dr. Gogate has also contributed 21 book chapters and has been also invited in collaboration with Prof. Pandit of the Institute of Chemical Technology to write two technology reports on Sonochemical Reactors and Hydrodynamic Cavitation Reactors as contribution to the European Roadmap of Process Intensification.

#### **PUBLICATIONS (PEER REVIEWED) SO FAR:**

263

**PATENTS:** 01

**CONFERENCE**

**PROCEEDINGS/PAPERS:** 27

**SEMINARS/LECTURES/  
ORATIONS DELIVERED:** 68

**PH.D.S AWARDED AS  
SINGLE/ CO-GUIDE:** 8

**MASTERS AWARDED AS  
SINGLE/ CO-GUIDE:** 32

**H-INDEX :** 58

**CITATIONS:** 11988 (AS PER GOOGLE SCHOLAR)

#### **SUBJECTS TAUGHT DURING 2016-17:**

Process Calculations, Cavitation for green processes, Chemical Reaction Engineering, Engineering applications of digital computers

#### **RESEARCH INTERESTS:**

Sonochemistry, Hydrodynamic Cavitation, Process Intensification, Water and Wastewater Treatment, Enzymatic Reactions, Polymer Chemistry, Advanced Oxidation Processes

#### **NUMBER OF RESEARCH STUDENTS CURRENTLY WORKING :**

P.D.F.- Nil RA -0  
Ph.D. (Tech.) -14 Ph.D.(Sc) - 1  
M. Tech. -5  
M. Chem. Eng -3  
M.Sc - Nil  
Others (if any) -Nil

#### **NUMBER OF RESEARCH PUBLICATIONS:**

International- 26  
National- Nil  
Conference presentations- 07  
Books Chapters- 03

#### **PATENTS:**

International - Nil  
Indian - Nil

#### **SPONSORED PROJECTS:**

Government- 02  
Private- 01

#### **PROFESSIONAL ACTIVITIES (MEMBERSHIP OF IMPORTANT COMMITTEES):**

- Member, Board of Governors & Honorary Secretary, UDCT Alumni Association
- Member, Editorial Board, Desalination and Water

Treatment (Taylor & Francis), 2016-2018

- Associate Editor, Chemical Engineering Processing, Process Intensification (Elsevier), 2016-2019
- Member, Executive committee, IChE Mumbai Regional Center
- Member, Editorial board, Ultrasonics Sonochemistry (Elsevier), 2015-2018

#### SPECIAL AWARDS/ HONOURS:

Maharashtra State national award for best research work done by teachers of Engineering Colleges, Indian Society for

Technical Education, New Delhi, 2016

#### PRG LAB FROM ADVANCED CENTRE



#### Ultrasonic Reactors

Ultrasonic horn, Ultrasonic bath, Ultrasonic flow cell with varying frequency, power dissipation and operating capacities. Reactor setup based on constant temperature heating bath



**SprayDryer Spraymate PLC-** Based Lab spray dryer with ultrasonic nozzle from Jay Instruments Systems PVT LTD.



#### MRS. KUMUDINI V. MARATHE

*B.E., M.Tech (Metallurgical engineering)*

Associate Professor in Chemical Engineering

#### GENERAL RESEARCH INTEREST AND EXPERTISE:

Membrane Separation, Water Treatment, Membrane Bioreactor, Arsenic & Fluoride Separation, Heavy Metal Separation, Process Intensification, Development of metal composites, Corrosion, Material failure analysis, Nano composites, Bioelectrochemical Membrane Reactor, Sustainability Studies

#### FELLOWSHIPS OF NATIONAL AND INTERNATIONAL ACADEMIES OF SCIENCE OR ENGINEERING (IF

ANY):

FELLOWSHIPS/  
MEMBERSHIPS OF  
PROFESSIONAL BODIES:

PUBLICATIONS (PEER  
REVIEWED) SO FAR : 33

PATENTS: 0

CONFERENCE  
PROCEEDINGS/PAPERS: 13

SEMINARS/LECTURES/  
ORATIONS DELIVERED: 09

PH.D.S AWARDED AS  
SINGLE/ CO-GUIDE: 2

MASTERS AWARDED AS  
SINGLE/ CO-GUIDE: 25

POST DOCTORAL FELLOWS  
SUPERVISED: 0

AWARDS/HONORS:

National - International -

H-INDEX : 9

CITATIONS: 390

HIGHLIGHTS OF RESEARCH  
WORK DONE AND IT'S  
IMPARTING (MAXIMUM  
TWO SINGLE-SPACED  
PAGES WITH FIGURES/  
DIAGRAMS ETC.):

Research scope mainly  
comprise of membrane based  
separation water treatment  
technologies. Extensive work in  
the field of micellar enhanced

ultrafiltration has been carried out where separations of heavy metal ions such as cobalt, nickel, copper, chromium etc were considered from aqueous streams. Various aspects of the field such as hydrodynamic studies, optimization, mathematical modelling, surfactant recovery, membrane fouling was considered in different studies. Studies to provide a sustainable solution for concentrated fluoride stream in membrane separation were carried out. Study of separation of different ions and their effect on separation efficiencies is also carried out. Membrane

Bioreactor for separation of pesticides, degradation of SDS surfactant and textile wastewater by controlled approach has been included in the recent studies. Other studies include development of metal composites, nano-composites and corrosion based material failure analysis. Process intensification in Bioelectrochemical Membrane Reactor have also been undertaken. Sustainability studies and comparison between different water treatment technologies was also carried out.

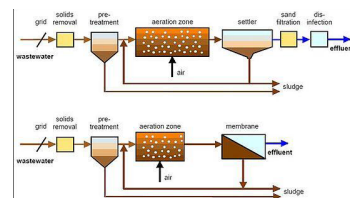


Figure 1: Membrane Bioreactor

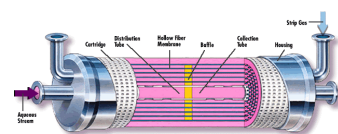


Figure 1: Membrane Bioreactor

TEN BEST / REPRESENTATIVE PUBLICATIONS / PATENTS :

Authors (in order)	Journal	Volume	Pages	Impact Factor
Nakhate P.H. Joshi N.T., Marathe K. V.	Reviews in Chemical Engineering	33 (2)	143-161	3.16
Chavan.K, Gopalan.S Marathe.K.V	International Journal of Exergy (2016)	20(2)	139-142	1.287
Jadhav.S.V, Marathe.K.V, Rathod.V.K	Journal of Water Process Engineering (2016)	13	153-167	0.913
Antonio Dominguez-Ramos, Karan Chavan, Verónica García, Guillermo Jimeno, Jonathan Albo, Kumudini V. Marathe, Ganapati D. Yadav,Angel Irabien	Industrial & Engineering Chemistry Research (2014)	53(49)	18920-18927	2.567
Vibhandik, A.D., Marathe, K.V.	Frontiers of Chemical Science and Engineering (2014)	8(1)	79-86	0.886
Jadhav.S.V., Marathe.K.V	Canadian Journal of Chemical Engineering (2013)	91(2)	311-317	1.003



Authors (in order)	Journal	Volume	Pages	Impact Factor
Patil, P.N., Marathe, K.V.	Separation Science and Technology (Philadelphia) (2013)	48(4)	547-553	1.16
Manchalwar, S.M., Anthati, V.A., Marathe, K.V.	Journal of hazardous chemicals (2012)	184(1-3)	485-492	4.679
Tadakamalla, K., Marathe, K.V.	Desalination(2011)	266(1-3)	98-107	2.751
Chaudhari, R.R., Marathe, K.V.	Separation Science and Technology(2010)	45(8)	1033-1041	1.16

#### SUBJECTS TAUGHT

##### DURING 2016-17:

Material Technology, advanced material science, industrial and engineering chemistry

##### SPECIFIC RESEARCH INTERESTS:

Functionalization of Membranes, Membrane Bioreactor and New Energy Materials.

##### RESEARCH STUDENTS CURRENTLY BEING SUPERVISED :

P.D.F.- 0 RA- 0  
Ph.D. (Tech.) -3 Ph.D.(Sc)- 0  
M.Tech. -0  
M. Chem. Eng-1

M.Sc- 0

Other (if any)-  
Undergraduate Summer Fellows (if any)- 1  
Teacher summer Fellows (if any)- 0

##### RESEARCH PUBLICATIONS:

National-  
International- 33  
(Peer-reviewed)- 33  
Conference proceeding - 16  
Books (if any) -

##### PATENTS:

International - 0  
Indian - 0

##### SPONSORED PROJECTS :

Government-  
Private- 02

##### PROFESSIONAL ACTIVITIES (MEMBERSHIP OF IMPORTANT COMMITTEES):

##### MEMBERSHIP OF EDITORIAL BOARDS WITH NAME OF JOURNAL AND AGENCY :

Member scientific advisory committee SWDEWES-2013

##### SPECIAL AWARDS/ HONOURS / ACCOLADES:

Best Paper Award  
SESTEC-2008  
Guiding Best MTech Thesis -  
Indian Society for Technical Education, 2005



### DR. PRAKASH D. VAIDYA

B. E. (Chem. Eng.), M. Chem. Eng.,

Ph.D. (Tech.) in Chem. Eng.

Rashtriya Chemicals and Fertilizers

Associate Professor of Chemical Engineering

#### FELLOWSHIPS / MEMBERSHIPS OF PROFESSIONAL BODIES:

Life Member, Indian Institute of Chemical Engineers

#### HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT (MAXIMUM TWO SINGLE-SPACED PAGES WITH FIGURES/DIAGRAMS ETC.):

- **Exploration of new absorbents for CO<sub>2</sub> capture**  
Reactive absorption is a useful CO<sub>2</sub> capturing technology for several chemical processes, e.g., steam methane reforming, natural gas processing, coal gasification and flue gas treatment. The development of new, efficient and easily regenerable solvents is desirable. In this work, several new absorbents such as amine blends, sterically hindered amines, polyamines, amino acid salts and amino sugars are explored.
- **Production of hydrogen by reforming of bio-oxygenates**  
The demand for hydrogen in the chemical and energy

industries is ever-increasing. It is commercially produced from steam methane reforming. However, it is now imperative to produce hydrogen from renewable resources. In this work, steam reforming of several biomass-derived oxygenates such as ethanol, glycerol, ethylene glycol, n-butanol and bio-oil for hydrogen production is studied. Besides, the reforming reaction is also performed in the aqueous phase. Finally, sorption-enhanced steam reforming, which enables production of pure hydrogen at mild reaction conditions, is investigated too.

- **Wastewater treatment**

In this work, the destruction of chlorinated organic pollutants by aqueous-phase catalytic hydrodechlorination is investigated. The performance of ruthenium as a catalyst appears encouraging. Besides, the efficacy of catalytic wet air oxidation for treatment of other wastewaters

(e.g., refinery spent caustic, biomethanated distillery wastewater and wastewater contaminated with nitrogenous organic pollutants) is investigated.

- **Production of renewable diesel by hydrotreatment of non-edible vegetable oils**

Renewable or bio-hydrogenated diesel (BHD) from catalytic hydrotreatment of non-edible vegetable oil represents a promising alternative to petroleum-based diesel. There are several advantages of using BHD, e.g., better product quality, avoidance of byproduct glycerol formation (unlike in biodiesel manufacturing), process flexibility and adaptability for wide variation in feedstock, possibility of the use of existing hydrotreatment units in petroleum refineries (and thus, low capital investment) and integration of renewable fluids in the refinery infrastructure. Therefore, BHD fuel has recently received extensive

attention. In this work, the catalytic hydrotreatment of Karanja and Jatropa oil is investigated. Two types of catalysts, viz. noble metals (Pd, Pt) and sulfided bimetals (Co-Mo, Ni-Mo and Ni-W) are selected for this study.

• **CO<sub>2</sub> utilization by Dry and Mixed Reforming of Methane**

In this work, syngas production via dry and mixed reforming of methane is investigated using commercial and lab-made catalysts in a fixed-bed reactor.

• **Catalytic hydrogenation**

In this work, catalytic hydrogenation of organic substrates in the aqueous phase is investigated in a three-phase slurry reactor using heterogeneous Ru-based catalysts.

**PUBLICATIONS (PEER REVIEWED) SO FAR: 59**

**PATENTS: 01**

**CONFERENCE**

**PROCEEDINGS/PAPERS : 02**

**SEMINARS/LECTURES/ ORATIONS DELIVERED: 05**

**PH.D.S AWARDED AS SINGLE/ CO-GUIDE: 09**

**MASTERS AWARDED AS SINGLE/ CO-GUIDE: 38**

**POST DOCTORAL FELLOWS SUPERVISED: 02**

**AWARDS/HONORS:**

National- 01

International- 02

**H-INDEX : 21**

**CITATIONS : 1773**

**SUBJECTS TAUGHT**

**DURING 2016-17 :**

Chemical Reaction Engineering (TYCE)

Industrial & Engineering

Chemistry (SYCE, TYCE)

Fuels Engineering (MTech GT)

Design and Analysis of Experiments (BTech Final Yr)

Instrumentation and Process

Control (TYBTech)

**SPECIFIC RESEARCH**

**INTERESTS:**

Chemical recycling of CO<sub>2</sub>

Reactive separation of CO<sub>2</sub>

H<sub>2</sub> production from biooxygenates

Production of biohydrogenated diesel

Wet Air oxidation

Catalytic hydrogenation

**NUMBER OF RESEARCH STUDENTS CURRENTLY WORKING :**

P.D.F. - RA- 01

Ph.D. (Tech.) -09 Ph.D.(Sc)- 08

M.Tech.- 03

M. Chem. Eng- 03

M.Sc - -

Other (if any) - -

Undergraduate Summer

Fellows (if any) - -

Teacher summer Fellows (if any) - -

**PUBLICATIONS:**

National-

International- 19

(Peer-reviewed)- 19

Conference proceeding -

Books(if any) -

**PATENTS:**

International – Nil

Indian - Nil

**SPONSORED PROJECTS :**

Government- 01

Private- 02

**PROFESSIONAL**

**ACTIVITIES:**

a) Membership of important committees:

b) Membership of Editorial Boards with name of journal and agency:

**SPECIAL AWARDS/**

**HONOURS:** Bioenergy

– Awards for Cutting Edge

Research (B-ACER) Fellowship

Program supported by DBT

and IUSSTF

**PHOTOGRAPH**

**(LABORATORY) (WITH NAMES). \***



Stirred Cell reactor



Catalytic Vapour phase reactor



High pressure stirred reactor system



Fixed-Bed Reactor



### **DR. VISHWANATH H. DALVI**

*B. Chem. Engg, UICT, Mumbai 2002; M.S. P.D.Eng., University of Twente, NL.; Ph.D. University of Texas at Austin, USA.*

R. A. Mashelkar Assistant Professor at the Department of Chemical Engineering, Institute of Chemical Technology, Mumbai

#### **FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES:**

#### **HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT (MAXIMUM TWO SINGLE- SPACED PAGES WITH FIGURES/DIAGRAMS ETC.):**

My work is primarily focused towards using principles of physics and engineering to quantitatively develop and evaluate potential of technologies of interest to the Indian public. Some initial successes have been the discovery that solar thermal technologies can eventually displace coal firing from Rankine cycle power plants. In a parallel endeavour, we have been able to work with

mechanical engineers to bring down the cost of solar-thermal collector by a factor of 4. We have simultaneously developed a protocol to use powerful, open source, data analysis platform for rapid process simulations: using which we were able to find a synergy between gas-power cycles and heat-treatment of waste aqueous streams. Several of these discoveries have been published in high impact journals or have patents filed. Our current focus is on developing a "Green Steam" cascade where solar thermal steam provides the core of a small semi-rural industrial estate. Our group also has a theory section that works on molecular simulations of confined surfaces (in collaboration with experimentalists in King

Abdullah University of Science and Technology, Saudi Arabia) and we are trying to use concepts of statistical mechanics to extract maximum utility out of the Cubic Equation of State framework.

**PUBLICATIONS (PEER REVIEWED) SO FAR: 8**

**PATENTS: 3 filed (Indian patents)**

**CONFERENCE PROCEEDINGS/PAPERS:**

**SEMINARS/LECTURES/ ORATIONS DELIVERED:**

**PH.D.S AWARDED AS SINGLE/ CO-GUIDE:**

**MASTERS AWARDED AS SINGLE/ CO-GUIDE:**

**DOCTORAL FELLOWS**



**SUPERVISED:****TOTAL NO. OF AWARDS/  
HONORS:**

National -  
International -

**H-INDEX :  
CITATIONS:**

H-INDEX: 5

CITATIONS: 195

**SUBJECTS TAUGHT  
DURING 2016-17:**

Advanced Mass Transfer,  
Process Simulation Lab II

**SPECIFIC RESEARCH  
INTERESTS:**

Molecular Simulations,  
Process Simulations, Solar  
Thermal Technologies, Synergy

Engineering

**NUMBER OF RESEARCH  
STUDENTS CURRENTLY  
BEING SUPERVISED :**

P.D.F.- 0 RA -

Ph.D. (Tech.)- 3

Ph.D.(Sc)- 1

M.Tech.- 0

M. Chem. Eng- 2

M.Sc - Other (if any) -

Undergraduate Summer Fellows  
(if any) -

Teacher summer Fellows (if  
any) -

**NUMBER OF RESEARCH  
PUBLICATIONS:**

National - International -8  
(Peer-reviewed) - 8

Conference proceeding -  
Books (if any) -

**PATENTS:**

International - Indian : 3  
Indian Filed

**SPONSORED PROJECTS:**

Government- 0 Private- 0

**PROFESSIONAL  
ACTIVITIES:**

- Membership of important Committees:
- Membership of Editorial Boards with name of journal and agency:

**SPECIAL AWARDS/  
HONOURS / ACCOLADES :**

Best Teacher Award ICT  
Mumbai 2017

**DR. RATNESH D. JAIN**

*Ph. D. (Tech.) in Pharmaceutics*

UGC Assistant Professor in Engineering

**PROFILE AND  
ACCOMPLISHMENTS SO  
FAR****FELLOWSHIPS/  
MEMBERSHIPS OF  
PROFESSIONAL BODIES:**

Fellowships

Young Associate of  
Maharashtra Academy of  
Sciences

**MEMBERSHIPS OF  
PROFESSIONAL BODIES:**

- Member, European

Respiratory Society,  
Switzerland

- Member, Young Scientist Committee, Controlled Release Society, USA
- Mentor, Mentor-Protégé Program, Member, Controlled Release Society, USA
- Member, Controlled Release Society- USA and Indian Chapter
- Member, Association of Biotechnology Led

Enterprises (ABLE), India

- Member, American College of Clinical Pharmacology, USA

**HIGHLIGHTS OF  
RESEARCH WORK  
DONE AND ITS IMPACT  
(MAXIMUM TWO SINGLE-  
SPACED PAGES WITH  
FIGURES/DIAGRAMS ETC.):**  
“To learn •To integrate • To  
apply • To achieve”

This has been my motivation  
towards achievement of my

short term and long term goals. I have a strong penchant for learning not only what is a part of my field of specialization, "Drug delivery systems in Pharmaceutical sciences", but also allied sciences bearing indirect but significant implications on the areas of my expertise. The research work conducted by myself during my early days to formulate a locally injectable liquid crystalline nanocarrier (LCNC) of ofloxacin-serratiopeptidase for effective non-surgical treatment of periodontitis. The dosage form was designed to form an in-situ "gel" after administration into the periodontal pocket where it would adhere to the mucosa of periodontal pocket due to its bioadhesive properties. Also, such a dosage form would act as a matrix to control release of both drug and peptide molecules. This formulation was found to be very effective in clinical studies and the results after thorough investigation are ready for publications. The objective of second investigation was to formulate a nanoemulsion for intranasal delivery of nitrendipine, which could deliver the drug through the nasal route for an increased bioavailability.

Further research undertaken by myself involved work packages concerning formulation and characterization of various polymeric nanocarriers including soft-shelled systems like polymeric micelles and hard-shelled systems like polymeric nanoparticles. Nose to brain route of administration

was studied to present a safe and acceptable alternative to conventional administration of various CNS targeted drugs despite the fact that less than 1% of the researchers all over the world engage in this research. The rationale behind designing micelles was that micellar nanocarriers exhibit sizes (approximately 25 nm) that make them suitable for transport through the olfactory mucosa thus offering direct targeting of the entrapped moieties to the brain. Potential molecules like sumatriptan and zolmitriptan was investigated in various animal models like rats and rabbits. The effect of this delivery system was interpreted by combination of various sensitive radio-imaging techniques like gamma scintigraphy, autoradiography and SPECT and provided an in-depth knowledge of the nose-to-brain transfer of these molecules. We have also shown a detailed mechanism of transfer of these molecules involving various physiological and neurological phenomenon.

In addition to the above mentioned research, due to my keen interest in polymeric nanoparticles, I have established various collaborations for working with these systems. Here, drug loaded polymeric nanoparticles were formulated employing Poly Lactic-Glycolic acid (PLGA) derivatives, Poly-Lactic acid derivatives and PLGA-Heparin were developed for coating them on cardiac stents. The research work was aimed at probing the mechanism

of drug release and evaluating the safety and efficacy of drug nanoparticle coated stents.

The objective of the post-doctoral work undertaken by myself was to employ novel biodegradable starch derivatives for targeting drug nanoparticles to the tumour cells. The project involved exploitation of various hydrophobically modified starch derivatives for application as polymer matrix for nanoparticle preparation. The hydrophobic modifications were found to facilitate encapsulation of hydrophobic moieties like idarubicin and docetaxel. As a Humboldt post-doctoral researcher I moved a step ahead and am attempting to integrate principles of molecular biology to develop delivery systems that can tackle diseases at the genetic level. This investigation has been initiated with the objective of developing nanoparticulate system for the siRNA delivery for the treatment of pulmonary diseases. These nanoparticles, formulated with a commercial polymer, were found to sufficiently bind and stabilize a model siRNA against luciferase protein. The transfection efficiency and the knockdown of luciferase protein with this formulation was found to be significantly higher when compared with naked siRNA. Furthermore, the kinetics of siRNA release inside live cells is currently being evaluated by labeling different cell organelles and siRNA with suitable dyes and subsequent Fourier resonance energy transfer technique.

Currently, my research group is focused on development of Biomaterials for controlled release of drugs/genes/proteins, Computational Pharmaceutics, Engineering of polymeric and metal nanoparticles for biomedical applications, Tissue engineering, Biomedical devices and sensors.

**PUBLICATIONS (PEER REVIEWED) SO FAR:** 24

**PATENTS:** 07

**CONFERENCE PROCEEDINGS/PAPERS:** 74

**SEMINARS/LECTURES/ ORATIONS DELIVERED:** 05

**PH.D.S AWARDED AS SINGLE/ CO-GUIDE:** None

**MASTERS AWARDED AS SINGLE/ CO-GUIDE:** 8

**H-INDEX :10 CITATIONS:** 335

**SUBJECTS TAUGHT DURING 2016-17:**

Biomaterials (B. Chem. Engg.), Research Methodology (M. Pharm, M. Chem. Engg., PhD Sci/Tech.), Biological Sciences and Bioengineering (B. Chem.

Engg.), Fermentation and Cell Culture Engineering (B.Chem Engg).

**RESEARCH INTERESTS:**

- (1) Pre-formulation studies and characterization of dosage forms
- (2) Formulation development for Biopharmaceuticals
- (3) Analytical characterization of biopharmaceuticals
- (4) Nano Drug Delivery and Continuous process development.

**NUMBER OF RESEARCH STUDENTS CURRENTLY WORKING :**

P.D.F- RA -  
Ph.D. (Tech.) - 7 Ph.D.(Sc) - 3  
M.Tech. - 4  
M.Chem.Eng -  
M.Sc - Others (if any) -

**RESEARCH PUBLICATIONS:**

International- 9 National-  
Peer-reviewed- Conference  
proceeding- Books -

**PATENTS:** International -  
Indian - 7

**SPONSORED PROJECTS :**

Government- 4  
Private- 1

**PROFESSIONAL ACTIVITIES (MEMBERSHIP OF IMPORTANT COMMITTEES):**

- Member, European Respiratory Society, Switzerland
- Member, Young Scientist Committee, Controlled Release Society, USA
- Mentor, Mentor-Protégé Program, Member, Controlled Release Society, USA
- Member, Controlled Release Society- USA and Indian Chapter

**MEMBERSHIP OF EDITORIAL BOARDS WITH NAME OF JOURNAL AND AGENCY:**

- Ultrasonics Sonochemistry - Elsevier
- European Journal of Pharmaceutics and Biopharmaceutics - Elsevier

**SPECIAL AWARDS/ HONOURS:**



**PROFESSOR DR. C. S. MATHPATI**

*B. Chem. Engg. M. Chem. Engg. Ph.D*

Assistant Professor

**PROFILE AND ACCOMPLISHMENTS SO FAR**

**FELLOWSHIPS/**

**MEMBERSHIPS OF PROFESSIONAL BODIES:**

Life Member, IICHe

**HIGHLIGHTS OF**

**RESEARCH WORK DONE AND ITS IMPACT (MAXIMUM TWO SINGLE-SPACED PAGES WITH FIGURES/DIAGRAMS ETC.):**

Research work comprises of the relative contribution of turbulent production, transport, dissipation terms estimated using the large eddy simulation results and comparison is made with the modeled terms in RANS models. A User Defined Function (UDF) had been written in a commercial software FLUENT, which calculate the exact terms of transport equations from the fluctuating components. CFD simulations had been carried out in various equipments (such as channel flow, Taylor-Couette flow, Jet loop reactor, Stirred vessel with radial and axial flow impellers), bubble column with various spargers. In these equipments, the agreement of RANS based models with the experiments was poor for mean or turbulent quantities or both. These deviations could be attributed to the modeling assumptions such isotropic flow, scalar turbulent viscosity, neglecting higher terms in turbulent and pressure transport, redistribution of turbulent kinetic energy in all three directions. In order to eliminate some of these problems, modifications had been made to standard  $k-\omega$  model in the literature. Some of these modifications (Lauder Sharma low Reynolds number model, SST  $k-\omega$  model and RNG  $k-\epsilon$  model) had been tested in JLR using OpenFOAM software.

Recent work includes of corrosion and heat transfer studies of molten salt, flow assisted corrosion in various pipe fittings such as short elbows, long elbows, tee junctions etc., scale-up of

photo bioreactors such as open raceway ponds, external lift-air lift reactor, studies in liquid-liquid extraction.

CFD modeling of fluidized bed of  $\text{Li}_2\text{TiO}_3$  is done and validated with the experimental data reported in literature. The objective of the developed CFD model was to predict the minimum fluidization velocity of Geldart B class particles of different materials, of different sizes at different bed wall temperatures and with different fluidizing media, viz., air, helium etc.

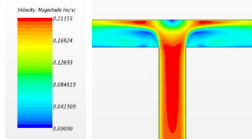


Figure 1: Tee junction dividing flow simulation



Figure 2: Molten salt flow loop

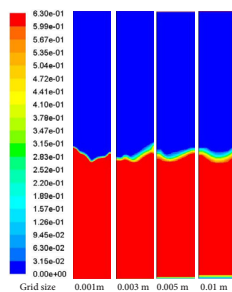


Figure 3: Contours of volume fraction of solids in Fluidized

Bed

PHOTOGRAPH (LABORATORY)(WITH NAMES). \*



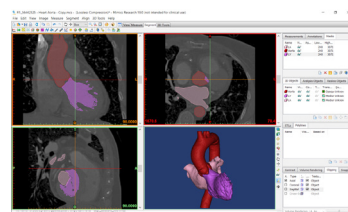
Experimental Set-up Design for Hydrodynamics Study



Lesser Doppler Anemometry



Particle Image Velocimetry Setup



Materialise MIMICS Software Belgium: For creation of 3D model

ANY OTHER RELEVANT ADDITIONAL INFORMATION. NA





**DR. PARAG R. NEMADE**

*B. Chem. Eng., M. S., Ph. D.*

UGC Assistant Professor in Engineering Science

**FELLOWSHIPS/  
MEMBERSHIPS OF  
PROFESSIONAL BODIES:**

Member, Indian Membrane Society

Member, Oil Technologists Association of India

Member, Indian Institution of Chemical Engineers

**HIGHLIGHTS OF  
RESEARCH WORK  
DONE AND ITS IMPACT  
(MAXIMUM TWO SINGLE-  
SPACED PAGES WITH  
FIGURES/DIAGRAMS ETC.):**

**PUBLICATIONS (PEER  
REVIEWED) SO FAR:** 10

**PATENTS:** 5 (filed)

**CONFERENCE  
PROCEEDINGS/PAPERS:**

**SEMINARS/LECTURES/  
ORATIONS DELIVERED:** 2

**PH.D.S AWARDED AS  
SINGLE/ CO-GUIDE:** 0

**MASTERS AWARDED AS**

**SINGLE/ CO-GUIDE:** 13

**POST DOCTORAL FELLOWS  
SUPERVISED:** 0

**AWARDS/HONORS**

National - 1 International - 1

**H-INDEX :**5

**CITATIONS:** 272

**SUBJECTS TAUGHT**

**DURING 2016-17:**

Advanced Momentum Transfer, Nanotechnology, Advanced Membrane Separation Processes, Chemical Engineering Laboratory

**SPECIFIC RESEARCH**

**INTERESTS:**

Membrane Separations, Catalysis, Sensors, Sustainability Engineering

**NUMBER OF RESEARCH  
STUDENTS CURRENTLY  
BEING SUPERVISED :**

P.D.F. -0 RA- 2

Ph.D. (Tech.) -3

Ph.D.(Sc)- 2 M.Tech.- 8

M. Chem. Eng- 2

M.Sc- 0

Other (if any) – 0

Undergraduate Summer Fellows

(if any)- 3

Teacher summer Fellows (if any)- 0

**NUMBER OF RESEARCH  
PUBLICATIONS:**

National - 0

International - 2

(Peer-reviewed) - 8

Conference proceeding -

Books(if any) - 0

**PATENTS:**

International -

Indian : 2 (filed)

**SPONSORED PROJECTS :**

Government-

Private

**PROFESSIONAL**

**ACTIVITIES:**

a) Membership of important Committees:

b) Membership of Editorial Boards with name of journal and agency:

**SPECIAL AWARDS/  
HONOURS / ACCOLADES :**



### **DR. DIPAK V. PINJARI**

*B. Tech. (Polymer Engineering and Technology), M. Tech. (Polymer Engineering and Technology), Ph. D (Tech) in Chemical Engineering  
DST-Inspire Faculty (Assistant Professor Grade)*

#### **PROFILE AND ACCOMPLISHMENTS SO FAR**

#### **FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES:**

- DST-INSPIRE Assistant Professor Grade (April 2013 - March 18)
- CSIR Senior Research Fellow (2007-2012)

#### **HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT (MAXIMUM TWO SINGLE-SPACED PAGES WITH FIGURES/DIAGRAMS ETC.):**

- **Solar Assisted Intensification of Chalcone : Advantage over conventional route**

##### **Summary:**

Present invention relates to the synthesis of Chalcone by the condensation of 4-methoxyacetophenone with 4-fluorobenzaldehyde by using Concentrated Solar Radiation (CSR) method, photochemical (UV radiation), thermal (600C) method and conventional (ambient temperature) method with Potassium hydroxide as a catalyst. The synthesized Chalcone derivative was

characterized by using FTIR and LCMS to evaluate its performance. The results were found to be excellent over the photochemical, thermal and conventional (ambient temperature) method in terms of saving in reaction time and total energy requirement. Through CSR method, we obtained 88% yield in 2 mins and conventional (ambient temperature) method, it took 4 hours to complete the reaction and obtained 85% yield. CSR method creates greener protocol toward organic synthesis.

- **Ultrasonically created rectangular shaped zinc phosphate nanopigment: Synthesis, Characterization and its anticorrosive performance**

##### **Summary:**

In the present study, the performance of zinc phosphate nanopigment (ZPn) embedded in epoxy resin meant for corrosion protection of mild steel has been investigated. A study was performed with epoxy resin at various concentrations of ZPn from 0 to 16 W/V % of the total paint composition. ZPn as well as the coatings were characterized using SEM,

XRD, Particle size analysis and FTIR spectroscopy. Corrosion tests were conducted using two different methods, such as dip test and salt spray test. Dip test was carried out in three different corrosive media such as acidic, basic and salty solutions. Salt spray test was carried out to create a corrosive attack on the coated samples in order to predict its suitability for use as a protective marine finish. It was found that synthesized ZPn when added to in epoxy resin provides better corrosion resistance at 12% W/V concentration levels.

- **Method of Preparation of Doped Zinc Phosphate nanocontainer and composition thereof**

##### **Summary:**

The present invention relates to a method for preparation of doped zinc phosphate nanocontainer. It further relates to synthesis of zinc phosphate nanoparticles and doping of N-octyl phosphonic acid on the surface of it to form zinc phosphate nanocontainer. Doped zinc phosphate nanocontainer was prepared by ultrasonication method. It further leads to doped zinc

phosphate nanocontainer with high yield and enhancement of corrosion inhibition. The present invention provides a method for manufacturing doped zinc phosphate nanocontainer, which can be indifferently have large application, ranging from doped zinc phosphate nanocontainer is good candidates for coating industry especially anti-corrosion due to its low solubility in water/biological environment and water repellent activity. Doped zinc phosphate nanocontainer can be used as highly effective corrosion inhibitor with high yield production. The method according to the present invention for preparing zinc phosphate nanoparticles comprising precursor used as zinc chloride and potassium dihydrogen phosphate and reaction is carried out by ultrasonication method to form nanoparticles of zinc phosphate and then resultant nanoparticles of zinc phosphate doped with N-octyl phosphonic acid at various concentration to form nanocontainer of doped zinc phosphate. The method has advantage of less toxic, simple, high yield with less time of reaction.

- **Synthesis of zinc molybdate and zinc phosphomolybdate nanopigments by an ultrasound assisted route: Advantage over conventional method**

#### Summary:

In the present study, zinc molybdate (ZM) and zinc phosphomolybdate (ZMP)

nanoparticles of white color were synthesized using conventional and innovative sonochemical co-precipitation method without any emulsifier. This new class of pigment is environmental friendly which can be used as an alternative to lead, cadmium and chromium pigment which contain carcinogenic species. Zinc chloride and sodium molybdate precursors were used during synthesis of ZM, and ZMP nanoparticles synthesis was accomplished using sodium molybdate, zinc sulfate and potassium dihydrogen phosphate. The synthesized materials were characterized by XRD, FTIR and TEM to determine the structure, the general type of atom bound in the compound and the morphology of the formed compounds respectively. The rapid saturation of the Zn<sup>2+</sup> ions takes place during the synthesis of ZM and ZMP nanoparticles due to ultrasonic irradiation, leading to a faster nucleation of ZM and ZMP nanoparticles with improved solute transfer rate. The average particle size is found to be significantly lower in case of ultrasound assisted synthesis compared to conventional precipitation method. The possible reasons are, improved solute transfer rate and rapid nucleation in the presence of cavitations generated by ultrasonic irradiations.

- **Intensified Release of Benzotriazole from Layer-by-Layer Assembled Zinc Molybdate Nanocontainers: Release Kinetics**

#### Summary:

In the current study, synthesis of zinc molybdate (ZM) using sonochemical precipitation method and ZM nanocontainer with the layer by layer doping of oppositely charged groups on the exterior of ZM nanoparticles was accomplished. In order to achieve compatibilization of ZM nanoparticles with polymers, the synthesized ZM nanoparticles were surface modified with a Myristic acid (MA). The loading of corrosion inhibitor (benzotriazole) was carried out in between two layers of polyelectrolyte i.e. polyaniline and polyacrylic acid. The mean particle size of sonochemically synthesized ZM nanoparticles was found less than 100 nm, which is attributed to micromixing and faster nucleation rate caused by acoustic cavitation. Results of XRD, PSD, FTIR, zeta potential and TEM analysis reports the successful formation of the layered structure of ZM nanocontainer particles with ZM nanoparticles at the core. The release rate of benzotriazole in water as a function of time at various pH values was quantitatively estimated using UV-vis spectroscopy. The effect of pH on responsive release of benzotriazole from ZM nanocontainers was investigated. Different semi-empirical models were examined to predict the release mechanism of the benzotriazole. These results signify the use of ZM nanocontainer in the multifunctional anticorrosion coating formulations.

- **Synthesis of Molybdenum disulphide by using ultrasound and conventional method: Comparison of effect of Calcination temperature on crystal properties of Molybdenum disulphide.**

#### Summary:

In the present study Molybdenum disulphide (MoS<sub>2</sub>) was synthesized by using ultrasound and conventional method. Synthesis of MoS<sub>2</sub> takes three steps; ultrasonically and conventionally synthesized MoS<sub>2</sub> was calcined in a muffle furnace at temperatures ranges from 150 °C to 650 °C in equal intervals of 100 °C to observe the changes in crystal structure and absorbance under UV-Visible light. Synthesized MoS<sub>2</sub> samples were characterized using XRD, SEM, elemental analysis and FTIR spectroscopy. It was found that crystallinity of MoS<sub>2</sub> synthesized by using ultrasound method was increased significantly along with major increase in absorbance under UV light than MoS<sub>2</sub> synthesized by using conventional method.

- **Ultrasound assisted manufacturing of paraffin wax nanoemulsions: Process optimization**

This work reports on the process optimization of ultrasound-assisted, paraffin wax in water nanoemulsions, stabilized by modified sodium dodecyl sulfate (SDS). This work focuses on the optimization of major emulsification process variables including sonication time, applied power and surfactant concentration. The effects of

these variables were investigated on the basis of mean droplet diameter and stability of the prepared emulsion. It was found that the stable emulsion with droplet diameters about 160.9 nm could be formed with the surfactant concentration of 10 mg/ml and treated at 40% of applied power (power density: 0.61 W/ml) for 15 min. Scanning electron microscopy (SEM) was used to study the morphology of the emulsion droplets. The droplets were solid at room temperature, showing bright spots under polarized light and a spherical shape under SEM. The electrophoretic properties of emulsion droplets showed a negative zeta potential due to the adsorption of head sulfate groups of the SDS surfactant. For the sake of comparison, paraffin wax emulsion was prepared via emulsion inversion point method and was checked its intrinsic stability. Visually, it was found that the emulsion get separated/creamed within 30 min. while the emulsion prepared via ultrasonically is stable for more than 3 months. From this study, it was found that the ultrasound-assisted emulsification process could be successfully used for the preparation of stable paraffin wax nanoemulsions.

- **Development of Smart Nanocontainers With A Zinc Phosphate Core and A pH-Responsive Shell for Controlled Release of Imidazole**

#### Summary:

A simple and flexible method has been developed to

fabricate reversibly switchable nanocontainers (by layer by layer assembly) using zinc phosphate (ZP) nanoparticles as a core material and subsequent deposition of oppositely charged species of polyelectrolyte (polyaniline and polyacrylic acid) and organic corrosion inhibitor (imidazole). Imidazole was entrapped between polyaniline (PANI) and polyacrylic acid (PAA). The PAA nanovalve can control the access of imidazole molecules to and from the nanocontainers. The average particle size of the synthesized nanocontainer was found to be in the range of 250–500 nm. X-ray diffraction (XRD), particle size analysis (PSA), zeta potential, and fourier transform infrared spectroscopy (FTIR) analysis confirms the successful formation of the layered structure of nanocontainers. UV-vis spectroscopy was used to analyze the release rate of imidazole in media of different pH as a function of time. This core-shell nanostructure can have potential applications in corrosion inhibition paint formulation.

**PUBLICATIONS (PEER REVIEWED) SO FAR: 55**

**PATENTS: 06**

**CONFERENCE PROCEEDINGS/PAPERS: -**

**SEMINARS/LECTURES/ ORATIONS DELIVERED: 14**

**PH.D.S AWARDED AS SINGLE/ CO-GUIDE: 01**

**MASTERS AWARDED AS SINGLE/ CO-GUIDE: 06**

**H-INDEX : 18**

**CITATIONS: 923**

**SUBJECTS TAUGHT DURING 2016-17:**

Introduction to Polymer Engineering, Pharmaceutical Engineering

**RESEARCH INTERESTS:**

Sustainable Engineering, Cavitation Technology, Nanomaterials, Polymer and Paints, Anticorrosion Coatings

**RESEARCH STUDENTS CURRENTLY WORKING :**

P.D.F.- 0 RA - 03

Ph.D. (Tech.) - 04

Ph.D.(Sc) - 02

M.Tech. -07

M.Chem.Eng -01

M.Sc -

Others (if any) -

**RESEARCH PUBLICATIONS:**

International- 60

National- 03

Peer-reviewed- Conference Proceeding- Nil Books- 04

**PATENTS:**

International - Nil

Indian - 06

**SPONSORED PROJECTS :**

Government- 01

Private- 07

**PROFESSIONAL ACTIVITIES (MEMBERSHIP OF IMPORTANT COMMITTEES): Nil**

**SPECIAL AWARDS/ HONOURS:**

- INAE Young Engineer Award 2016 by The Indian National Academy of Engineers, New Delhi, India
- Finalist, INSA Medal for

Young Scientist 2015 and 2016

- Finalist, NASI Young Scientist Awards 2014 and 2015
- Awarded Fulbright OLF Award 2015 by OIE and CIES (State Departments, US Federal Government, Washington, USA)
- Awarded Young Engineers Award 2014-2015 by The Institution of Engineers (India)
- Awarded Wipro Earthian Award 2013 by Wipro foundation, Bangalore (India)
- Young Associate, Maharashtra Academy of Science (2013)
- Awarded M. P. Chary Memorial Award 2013 for research and technological contribution (below 35 years). The M P Chary Memorial Award was constituted by Indian Institute of Chemical Engineers (IChE), India.
- Selected for the Swiss Government Excellence Scholarship program 2013-2014.
- Awarded Dr. K. H. Gharda Best PhD Thesis Award 2013.
- Awarded Ambuja Cement Best Thesis Award 2013.
- Awarded Department of Science and Technology Inspire Faculty Award 2013-2018.
- Awarded University Grant Commission, Government of India D S Kothari

Postdoctoral Fellowship 2013-2016.

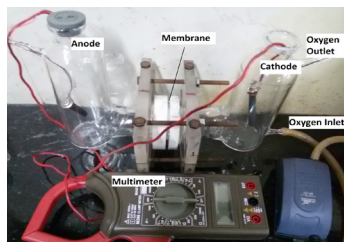
- Selected for Fulbright Nehru Science Postdoctoral Program 2013-2014. (Place: Georgia Institute of Technology, Atlanta (USA))



Hydrodynamic Cavitation Set-up



Acoustic cavitation set-up



Microbial fuel cell set-up



Solar set-up

**ANY OTHER RELEVANT ADDITIONAL INFORMATION. \* -Nil**





## DR. SHARAD M. SONTAKKE

Ph.D (Chem. Eng.)

DST INSPIRE Faculty

### SUBJECTS TAUGHT:

- Environmental Engineering and Process Safety (TY Chem. Eng.)
- Design and Analysis of Experiments (Final year, B Chem. Eng., B. Tech.)
- Chemical Engineering Operations (TY B.Tech.)
- Transport Phenomena (SY B.Tech.)
- Chemical Engineering Laboratory (TY Chem. Eng./ Final Year Chem. Eng.)

### RESEARCH INTERESTS:

- Catalyst synthesis,
- Photocatalytic degradation,
- Dye sensitized solar cells,
- Biodegradable and conducting polymers,
- Environment assessment

### RESEARCH STUDENTS :

Ph.D. (Tech.) - 5

M. Chem. Eng - 2

### SPONSORED PROJECTS :

Government - 1 Private- 0

Consultancy- 4

### PUBLICATIONS (PEER REVIEWED) SO FAR: 5

### CONFERENCE PROCEEDINGS/PAPERS

: 3

### SEMINARS/LECTURES/

### ORATIONS DELIVERED: 4

### MASTERS AWARDED AS SINGLE/ CO-GUIDE: 4

### AWARDS/HONORS:

National- 1

### H-INDEX: 3

### CITATIONS: 79

### HIGHLIGHTS OF

### RESEARCH WORK DONE:

- **Synthesis and application of combustion synthesized TiO<sub>2</sub>**

The photocatalytic inactivation experiments were carried out using E. coli K-12, a bacterial strain and P. pastoris (X-33), a yeast strain, as model microorganisms. The results demonstrate higher photocatalytic activity of all the combustion synthesized catalysts than commercial Degussa P-25 catalyst. The optimum catalyst concentration was 0.25 g/L and the maximum inactivation was observed in the presence of Ag/TiO<sub>2</sub> (Imp) catalyst. Rapid and complete inactivation of the microorganisms was observed at lower initial cell concentrations. A reduced photocatalytic inactivation was observed in presence of various anions (HCO<sub>3</sub><sup>-</sup>,

SO<sub>4</sub><sup>2-</sup>, Cl<sup>-</sup> and NO<sub>3</sub><sup>-</sup>) and cations (Na<sup>+</sup>, K<sup>+</sup>, Ca<sub>2</sub><sup>+</sup> and Mg<sub>2</sub><sup>+</sup>). Even a small addition of H<sub>2</sub>O<sub>2</sub> was observed to improve the photocatalytic inactivation. At higher dosage of H<sub>2</sub>O<sub>2</sub>, a 2 min exposure was sufficient to result in a complete inactivation. Changing the initial pH of the solution was observed to have no significant effect on the photocatalytic inactivation.

- **Photocatalytic degradation of azo dyes using sol-gel CeO<sub>2</sub>:**

The photocatalytic degradation of Xylene Milling Yellow 6 G in aqueous solutions under UV exposure was studied with sol-gel synthesized CeO<sub>2</sub> catalyst. The effects of catalyst loading, initial dye concentration, pH and temperature were studied and the optimum values for maximum degradation were determined. Using a 125 W high pressure mercury lamp, an optimum degradation of 10 ppm dye solution was observed with 1 g/L catalyst. Initial dye concentration exhibited a significant negative effect on

photocatalytic degradation. With 1 g/L catalyst, natural pH of the solution, ambient temperature, and initial dye concentration of 10 ppm, complete degradation was achieved within 30 min of UV exposure. The sol-gel synthesized catalyst showed better photocatalytic activity than combustion synthesized as well as commercial catalysts. A degradation mechanism was proposed based on the degradation products identified by LC-MS.

• **Studies in DSSC:**

Anatase TiO<sub>2</sub> nanoparticles were synthesized by various techniques. The synthesized materials were characterized by X-ray diffraction, scanning electron microscopy, pore diameter, pore volume and surface

area. Dye sensitized solar cells were fabricated using the synthesized materials and characterized for incident photon to current conversion efficiency, photocurrent density to photovoltage measurement

and electrochemical impedance analysis. Among the studied materials, TiO<sub>2</sub> synthesized by acid-base co-catalyst method displayed highest solar cell efficiency of 6.77%.

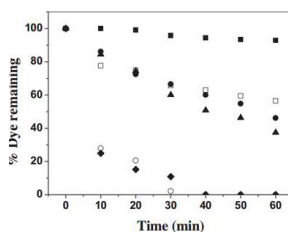


Figure: Effect of catalyst concentration on the photocatalytic degradation of XMY dye

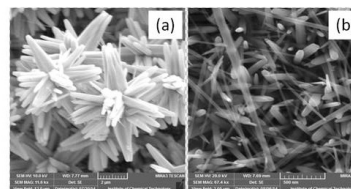


Figure: SEM images of ZnO nanorods a) tripod structure, b) nanorods

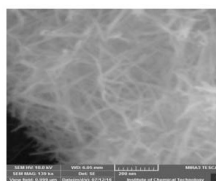


Figure: SEM image of the synthesized TiO<sub>2</sub> nanowires

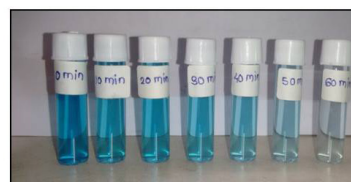


Figure: Typical results for photocatalytic dye degradation study



**DR. JYOTI S. GOKHALE**

Ph. D (Tech.)

UGC Assistant Professor

FELLOWSHIPS/  
MEMBERSHIPS OF  
PROFESSIONAL BODIES:  
BRSI, UAA

HIGHLIGHTS OF  
RESEARCH WORK  
DONE AND ITS IMPACT  
(MAXIMUM TWO SINGLE-  
SPACED PAGES WITH  
FIGURES/DIAGRAMS ETC.):

PUBLICATIONS (PEER  
REVIEWED) SO FAR: 05

PATENTS: -

CONFERENCE  
PROCEEDINGS/PAPERS: 01

SEMINARS/LECTURES/  
ORATIONS DELIVERED :

PH.D.S AWARDED AS

SINGLE/ CO-GUIDE: -

MASTERS AWARDED AS  
SINGLE/ CO GUIDE: 02

POST-DOCTORALFELLOWS  
SUPERVISED: -

AWARDS/HONORS

National - NA

International - NA

H-INDEX: 4  
CITATIONS: 58

#### SUBJECTS TAUGHT DURING 2016-17:

Food Biotechnology,  
Principles of Food Analysis,  
Waste Management in Food  
Processing, Fermentation  
Technology, Biochemistry Lab,  
Technical Analysis Lab

#### SPECIFIC RESEARCH INTERESTS:

Food Biotechnology,  
Bioprocess Technology, Waste  
Management

#### NUMBER OF RESEARCH STUDENTS CURRENTLY

BEING SUPERVISED :  
P.D.F. - - RA- -  
Ph.D. (Tech.)- - Ph.D.(Sc) -  
M.Tech. -3  
M. Chem. Eng- -  
M.Sc- -  
Other (if any)- -  
Undergraduate Summer Fellows  
(if any)-  
Teacher summer Fellows (if  
any)- -

RESEARCH PUBLICATIONS:  
National - International - 05  
(Peer-reviewed)-  
Conference proceeding - 01  
Books(if any) - 2 (Book  
chapters)

#### PATENTS:

International- NA  
Indian- NA

#### SPONSORED PROJECTS :

Government- NA  
Private NA

#### PROFESSIONAL ACTIVITIES:

a) Membership of important  
Committees: NA  
b) Membership of Editorial  
Boards with name of journal  
and agency: NA

SPECIAL AWARDS/  
HONOURS / ACCOLADES  
: NA

ANY OTHER RELEVANT  
ADDITIONAL  
INFORMATION. \* NA



#### PROFESSOR PUSHPITO KUMAR GHOSH

*B. Sc. (Chemistry), St. Stephen's College, Delhi University*

*M. Sc. (Chemistry), IIT Kanpur (Thesis supervisor, Professor Goverdhan Mehta)*

*Ph. D. Chemistry (Princeton University, USA) (Supervisor Professor T. G. Spiro)*

K. V. Mariwala-J. B. Joshi Distinguished  
Professor of Chemical Engineering

#### PROFILE AND ACCOMPLISHMENTS SO FAR

#### FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES:

Fellow, Indian Academy of  
Science  
Honorary Fellow, Indian  
Institute of Chemical Engineers

#### HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPART (MAXIMUM TWO SINGLE-SPACED PAGES WITH FIGURES/DIAGRAMS ETC.):

- Novel nanofiltration

- membranes
- Applications of concentrated solar thermal and solar photothermo chemical radiation
- Innovations around bio-resources
- New selective extraction protocol

#### PUBLICATIONS (PEER REVIEWED) SO FAR: 88

#### PATENTS (ONLY GRANTED US PATENTS SHOWN): 49

#### KEYNOTE ADDRESS/ INVITED LECTURES (2015 ONWARD): 11

#### PH.D.S AWARDED AS SINGLE/ CO-GUIDE: 7

#### H-INDEX:32

#### CITATIONS: 3990

#### SUBJECTS TAUGHT DURING 2016-17:

Industrial Engineering  
Chemistry, Innovations in  
Chemical Technology,  
Renewable Energy Sources,  
Safety

#### RESEARCH INTERESTS :

Research on estimating toxic impurities in phosphate fertilizers and ways and means of eliminating the same; Development of novel

approaches to water purification in rural household; recycle of wastewater, e.g., from washing machine; energy conservation through forward osmosis

#### RESEARCH STUDENTS CURRENTLY WORKING :

RA - 01  
Ph.D.(Sc) - 01  
M.Chem.Eng - 02  
Project Assistants - 03

#### RESEARCH PUBLICATIONS:

International- 02  
National-  
Peer-reviewed-  
Conference proceeding- 07  
Books-

#### PATENTS:

International - 01  
Indian - 03

#### SPONSORED PROJECTS:

Government- 01  
Private- 03

#### PROFESSIONAL

#### ACTIVITIES (MEMBERSHIP OF IMPORTANT COMMITTEES):

Chairman, Water Technology Initiative, Department of Science & Technology, GoI  
Chairman, TIFAC Technology Vision 2035 (Drafting Committee, Water)

Chairman (invitation basis), Programme Evaluation Committee, Bilateral Programmes, CII-GITA, New Delhi

Member, Prize Award Committee, NRDC, New Delhi

Member, Common Research and Technology Development Hubs (CRTDH), DSIR, N. Delhi

Member, Tripartite Awards Committee of ViswakarmaRashtriyaPuraskar and National Safety Awards

Member, Board of Directors,

Barefoot College, Tilonia, Rajasthan

#### SPECIAL AWARDS/HONOURS:

- Lifetime Achievement Award of Indian Desalination Association

#### PHOTOGRAPH (LABORATORY) (WITH NAMES). \*



Efficient ultrafiltration unit for rural households utilizing available resources



#### PROFESSOR JYESHTHARAJ B. JOSHI

*B.Chem.Engg., Ph.D.(Tech)*

J. C. Bose Fellow

#### PROFILE AND ACCOMPLISHMENTS SO FAR :

#### FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES:

- (1) Fellow, The World Academy of Sciences (TWAS),
- (2) Fellow, Indian National

- Science Academy (INSA),
- (3) Fellow of Indian Academy of Science (IASc),
- (4) Hon. Fellow, Indian Institute of Chemical Engineers,
- (5) Fellow, Maharashtra Academy of Sciences,
- (6) Patron Fellow, Marathi

Vidnyan Parishad

#### HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT (MAXIMUM TWO SINGLE-SPACED PAGES WITH FIGURES/DIAGRAMS ETC.):

- Professor Joshi has guided 81 Ph.D. thesis and 60 Masters

- thesis. He has published more than 450 papers in international cited journals and more than 60 state of the art reviews/ monographs/ book chapters. Specifically, he has co-authored (with Dr. L. K. Doraiswamy) a chapter on “Chemical Reaction Engineering: in new Chemical Engineers’ Handbook and written a monograph on “Hydrodynamic Stability in Multiphase Reactors” in Advances in Chemical Engineering.
- Professor Joshi has more than 10000 citations and h-index of 52(web of science).
  - The Chem. Tech journal (published by ACS, USA upto 2002) through its editorial briefs (named heart-cut), has recommended the use of his procedures for the industrial design. Such a recommendation has been made five times which is a record by itself and is truly unique achievement.
  - Professor Joshi has been able to enhance the productivity and selectivity of a number of manufacturing processes including those competitively offered on the global basis. He has invented a large number of novel designs, which are far superior in performance and less expensive in capital and operating costs. For all these developments, there has been a strong basis of fundamental sciences. His major contributions include: (i) novel designs of multiphase equipment (for hydrogenation, oxidation, ammonolysis, hydrohalogenation, halogenations, alkylation, etc.). (ii) He has improved productivity and selectivity of a large number of ongoing commercial operations resulting into 2 to 20 times enhancement in business.
  - His analysis and modeling of probably most complex multiphase reaction (NOx absorption) has resulted into commercial designs of many plants with capacities in the range of 1 to 250 ton/day for selective manufacture of sodium nitrite and Process Intensification of nitric acid plants of capacities upto 700 tons/day. Extension of Professor Joshi’s work in this area earned the British Oxygen Company the coveted Kirkpatrick Award of Chemical Engineering, McGraw hill, 2002.
  - No wonder because of his proven and exceptionally successful track record, Professor Joshi is most sought after academic consultant.
  - Professor Joshi’s leadership as Director (1999-2009) has brought total autonomous and subsequently separate University status to the Institute. He almost doubled the output of Ph.D. students, international publications, citation output per year. On the basis of publications per year, he brought the Department of Chemical Engineering at a rank of 6th in the World (Survey carried out by Professor Sommerfield of Georgia Institute of Technology, USA.
  - He brought the project funding almost 10 times and donation 2 times the funding per year given by the state government.
  - During his tenure of 10 years, the external revenue generation (ERG) had a compounded growth of 25% per year. He created seven Endowment Chairs. He vastly improved the infrastructure and collected funds for the construction of about 40,000 m<sup>2</sup> of laboratory space, student, and faculty housing.
  - He has established two ultramodern research centers in the areas of bioenergy and atomic energy with research facilities for additional 130 Ph.D. and 60 Masters students.
  - He also started a comprehensive mission of Process Intensification with a strong participation of industry. He also started a new academic program of management for the doctoral students which has been very well received by the industry and the national research laboratories.
  - As a social responsibility, he has helped setting up ten small-scale commercial plants.
  - In India 125 billion dollar/year worth energy is used



for household cooking: 50% of this energy is in commercial from (LPG, NG, Coal, kerosene) and 50% noncommercial solid fuels. The thermal efficiency of commercial fuel in conventional cooking practice is 10 to 25%. Professor Joshi and co-workers have developed new designs of cookers (with capacities catering to 5 to 2000 persons) with thermal efficiency in the range of 65-75%. He has also developed new designs of stoves (for solid noncommercial fuels) having thermal efficiency in the range of 40 to 50% as compared with conventional practice of 10 to 20%. Both the technologies have been licensed. This invention is useful for the entire developing world. The technology of continuous cooking has also been transferred to society.

- Professor Joshi has been very active in prompting science awareness in society. He has also motivated school and junior college students for selecting “research” as profession. For these two purposes, he (with the help of about 60 Ph.D. students in the institute) had held 200 workshops attending about 100,000 participants every year.
- Professor Joshi is passionate about and has solved a large number of pollution problems and converted the liabilities into assets. In majority of cases, there

have been innovative technologies.

- Currently, is a president of Marathi Vidnyan Parishad which has been active in improving scientific temper of the society.

**PUBLICATIONS (PEER REVIEWED) SO FAR:** 492

**PATENTS:** 5

**CONFERENCE PROCEEDINGS/PAPERS:** 38

**SEMINARS/LECTURES/ ORATIONS DELIVERED:**110

**PH.D.S AWARDED AS SINGLE/ CO-GUIDE:** 81

**MASTERS AWARDED AS SINGLE/ CO-GUIDE:** 60

**H-INDEX :** 54

**CITATIONS:** 10500

Based on Web of Science (all sources)

**SUBJECTS TAUGHT DURING 2016-17:**

- Multiphase Reactor Engineering(M.Chem Engg)
- Multiphase Reactor Design (T.Y.B.Chem Engg)
- Mixing Theory and Practice(All Branches of B.Tech)

**RESEARCH INTERESTS:**

Fluid Mechanics, Multiphase Reactor Design, Computational Fluid Dynamics, Atomic Energy, Solar Energy, Bio-Energy

**NUMBER OF RESEARCH STUDENTS CURRENTLY WORKING :** 16

P.D.F.-2

RA - 5

Ph.D. (Tech.) -8

Ph.D.(Sc) -NIL

M.Tech. -1

M.Chem.Eng -NIL

M.Sc - NIL

Others (if any) -NIL

**NUMBER OF RESEARCH PUBLICATIONS:**

International- 450

National- 25

Peer-reviewed- 470

Conference proceeding- 38

Books-9 (Book Chapters)

**PATENTS:**

International -1

Indian -4

**SPONSORED PROJECTS:**

Government- 2

Private- 3

**PROFESSIONAL ACTIVITIES (MEMBERSHIP OF IMPORTANT COMMITTEES):**

Coal Cleaning Initiative, DST, Government of India  
Chairman Science Advisory Committee, CSIR-IICT  
Hyderabad

**SPECIAL AWARDS/HONORS:**

Fellow, Indian National Academy of Engineers (INAE)

**PHOTOGRAPH (LABORATORY) (WITH NAMES). \***



Particle Image Velocimetry Setup



Lesser Doppler Anemometry

ANY OTHER RELEVANT  
ADDITIONAL  
INFORMATION. \*



**PROFESSOR LAKSHMI KANTAM MANNEPALLI**

*Ph.D. (Chemistry) Science*

DR. B. P. Godrej Professor of Green Chemistry and Sustainability Engineering

**PROFILE AND ACCOMPLISHMENTS SO FAR**

**FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES :**

- Dr. B. P. Godrej Distinguished Professor
- Member, Board of Governors, IIT-Hyderabad.
- Member, Standing Committee for Promoting Women in Science
- Member, RAC- DRDO
- Member, Scientific Advisory Committee (SAC) on Hydrocarbons of MoP&NG
- Member, DST-PAC (Inorganic and Physical

Chemistry)

- Member, Selection Committee, Raja Ramanna Fellowship Scheme, DAE, India

**HIGHLIGHTS OF RESEARCH WORK DONE AND ITS**

**IMPACT** (maximum two single-spaced pages with figures/diagrams etc.):

Annexure I

**PUBLICATIONS (PEER REVIEWED) SO FAR:** 333

**PATENTS:** 52

**CONFERENCE PROCEEDINGS/PAPERS:**

20

**SEMINARS/LECTURES/ ORATIONS DELIVERED:** 25

**PH.D.S AWARDED AS SINGLE/ CO-GUIDE:** 40

**MASTERS AWARDED AS SINGLE/ CO-GUIDE:** -

**H-INDEX :57 CITATIONS:** 11809

**SUBJECTS TAUGHT DURING 2016-17:**

(1) M. Tech. Green Technology: Nanomaterials-Fundamentals and Applications

**RESEARCH INTERESTS:**

Catalysis, Process chemistry, Nanomaterials

Number of research students

#### CURRENTLY WORKING :

P.D.F.- 1 RA- 2  
Ph.D. (Tech.) -  
Ph.D.(Sc) - 01  
M.Tech. -1  
M.Chem.Eng -1  
M.Sc - , Others (if any)

#### RESEARCH PUBLICATIONS:

International- 10, National-  
Peer-reviewed-  
Conference proceeding- 4  
Books - 0

#### PATENTS:

International -, Indian -

#### SPONSORED PROJECTS :

Government-  
Private- 4

#### PROFESSIONAL ACTIVITIES (MEMBERSHIP OF IMPORTANT COMMITTEES):

- Dr. B. P. Godrej Distinguished Professor
- Independent Board of Directors- Indo Amines Ltd.
- Member, Board of Governors, IIT-Hyderabad.
- Member, Standing Committee for Promoting Women in Science
- Member, RAC- DRDO
- Member, Scientific Advisory Committee (SAC) on Hydrocarbons of MoP&NG

- Member, DST-PAC
- Member, Selection Committee, Raja Ramanna Fellowship Scheme, DAE, India

#### SPECIAL AWARDS/ HONOURS:

- Professor Darshan Ranganathan Memorial Lecture Award (2016)
- Asian Paints Padma Vibhushan Dr RA Mashelkar Medal and Chemcon Distinguished Speaker Award (for leadership in Science, Technology and Education) (2016).

## NON - TEACHING STAFF PHOTO



**U. A. Sathe**  
Jr. Engineer



**S. M. Mane**  
Sr. Tech. Assistant



**M. S. Harkar**  
Sr. Tech. Assistant



**P. P. Bhole**  
Lab Assistant



**L. E. Sawant**  
Lab Assistant



**R. B. Mohite**  
Lab Assistant



**V. A. Bhambid**  
Lab Assistant



**Smita S. Waghmare**  
Jr. Typist Clerk



**A. G. Pawshe**  
Lab Attendant



**Shri Samudra Prashant**  
Lab Attendant



**Shri S. K. Sawant**  
Lab Attendant

## LIST OF ENDOWMENT

Sr. No.	Date	Name of Faculty	Title	Endowment
1	22.03.2016	Prof. Rajagopalan Srinivasan Indian Institute of Technology Gandhinagar Vishwakarma Government Engineering College Complex, Chandkheda, Visat-Gandhinagar Highway, Ahmedabad, India	Cognitive Engineering for Process Safety: Quantifying the Building Blocks of Human Error	Dr. G.P. Kane Visiting Professorship in Chemical Engineering
2	29.08.2016	Prof. Bipin Vora Consultant and R & D Advisor UOP/Honeywell Fellow (Retired) AIChE Fellow,1324 Kallien Avenue, Naperville, IL 60540	“From Concept to Commercialization	The Dow Prof. M.M Sharma Distinguished Visiting Professorship in Chemical Engineering
3	10.11.2016	Prof. Zhou Weibiao Professor & Director, Food Science & Technology Programme, National University of Singapore	Designing advanced control systems for modern bread-making process: from dough freezing to bread baking”	Professor Arun Mujumdar Distinguished Visiting Professor
4	24.11.2016	Mr. S.Ganapathy, M.S., FIE Chartered Engineer & Project Consultant	Status of Chemical Industries in India & Job Prospects	
5	14.12.2016	Prof. Wilhelm Höflinger Krems/Lower Austria, Austria	1) Fundamentals and measurement of particles Characterization of particle systems 2) Particle size measurement methods Optical imaging methods	Professor B.D. Tilak Visiting Fellowships
6	23.12.2016	Prof. Vikramaditya G. Yadav Assistant Professor in Department Of Chemical & Biological Engg. University of British, Columbia	Building Brains: Marrying Engineering & Medicine in the Fight Against Alzheimer Disease	Shri G.M. (alias Dada) Abhyankar Memorial Distinguished Fellowship in Chemical Engineering
7	13.01.2017	Prof. Daniel G. Nocera Chemist & leading Researcher in renewable energy	Fuels to Food from Sunlight, Air and Water	Shri V.V. Mariwala Visiting Professorship in Chemical Engg

8	21.01.2017	Dr. Rajender S. Varma United States Environmental Protection Agency	Greener routes to Organics and Nanomaterials: Sustainable Applications of Magnetic Nanocatalysts and Modified Graphitic Carbon Nitrides in Catalysis and Environmental Remediation	Shri K.J. Somaiya Visiting Professorship in Chemical Engg.
9	25.01.2017	Dr. Ajay Kumar Dalai Professor of Chemical Engineering University of Saskatchewan, S K Canada	Novel Activated Carbon Materials Development for Various Industrial Applications	Smt. Kusumben and Shri Mathradas Kothari Visiting Professorship In Chemical Engg.
10	01.02.2017	Prof. Sivaram Arepalli Department of Chemical and Biomolecular Engineering, Rice University, Houston, TX	Status and Future of Nanomaterials in Energy Storage	Golden Jubilee Visiting Fellowship
11	23.02.2017	Mr. Dilip Kapasi, Lead Process Engineer Project Management, LNP Projects, United States	Status of LNG, Regasification plants w r t India * Deepwater gas exploration - topside/ MEG * Role of a chemical engineer in today's India * ICT- our strongest Instituion from a vantage point	Golden Jubilee Visiting Fellowship In Chemical Engg
12	18.04.2017	Dr. Mugdha Gadgil Sr. Scientist National Chemical Laboratory, Pune	Recombinant biopharmaceuticals: from choosing the best clones to managing product quality	Professor R.A. Rajadhyaksha Memorial Lecture series Endowment in Chemical Engineering
13	18.07.2017	Prof. Amol V. Janorkar Biomedical Materials Science, School of Dentistry University of Mississippi Medical Centre, Jackson, MS, USA	Multifunctional Biopolymer Coatings and Scaffolds for Tissue Engineering and Drug Delivery	Golden Jubilee Visiting Fellowship



14	02.08.2017	Prof. Doraiswami Ramkrishna H.C. Peffer Distinguished Professor, Purdue University West Lafayette, USA	Modeling Transfer of Antibiotics Resistance among Bacterial Species	Dr. Balwant S. Joshi Distinguished Visiting Professorship in Chemical Engineering/ Chemical Technology/ Applied Chemistry
15	07.08.2017	Professor Upal Ghosh, Associate Editor, Environmental Toxicology and Chemistry ,Department of Chemical, Biochemical, and Environmental Engineering, University of Maryland Baltimore County Technology Research Center. Rm 257,5200 Westland Blvd Baltimore, MD 21227	Remediation of Polluted Sediments by Controlling Bioavailability	Golden Jubilee Visiting Fellowship
16	14.08.2017	Professor Rajesh Shende Associate Professor of Chemical Engineering Department of Chemical and Biological Engg South Dakota School of Mines and Technology Rapid City, South Dakota 57701	Advanced Nanomaterials for Hydrogen and Biofuels Production	

## B.CHEM. ENGG. 2016-17 SEMINAR

Sr. No.	Roll No.	Name of Student	Topic	Supervisor
1	13CHE1019	GUPTA HANSIKA ARUN	Advances in solar water pumping systems for irrigation	Prof. A.B. Pandit
2	13CHE1033	PAWAR RITESH DINKAR	Thermal and catalytic depolymerization of waste plastic	Prof. A.B. Pandit
3	13CHE1035	MUNGAD ADITYA ANIL	Acoustic Cavitation Reactors	Prof. A.B. Pandit
4	13CHE1070	GAIKWAD TANMAY ASHOK	Design and Management of City water supply Network	Prof. A.B. Pandit
5	13CHE1001	MEHTA OMKAR RAJENDRA	Novel UASB Biodigester designs for methane production	Prof. A.M.Lali

6	13CHE1003	GARG PARTH RAJIEEV	PhotoBioreactors for Algae production	Prof. A.M.Lali
7	13CHE1022	DABHADKAR KEDAR CHANDRASHEKHAR	Catalytic conversion of Lignin to Chemicals	Prof. A.M.Lali
8	13CHE1047	KANE ASHWIN ATUL	Green hydrogen production	Prof. A.M.Lali
9	13CHE1014	SAXENA AAYUSHI	Critical review of synthesis and applications of dendrimers and related structures	Prof. A.V.Patwardhan
10	13CHE1029	PATIL ADITYA NARENDRA	Critical review of dyes, textile, and pharmaceutical industry effluents and their abatement method	Prof. A.V.Patwardhan
11	13CHE1046	PANDYA DARSHAN VIMAL	Critical review of microbial colorants	Prof. A.V.Patwardhan
12	13CHE1071	JADHAV AKSHAY BHALCHANDRA	Critical review of mixer design methods for all applications including single phase, two-phase, and multiphase systems, including static mixers	Prof. A.V.Patwardhan
13	13CHE1005	DATAR ARCHIT NIKHIL	Large eddy simulations of jets in crossflow	Prof. A.W.Patwardham
14	13CHE1007	NAGPAL AMAN DEEP ANUP	Electrical tomography techniques for liquid – liquid flows	Prof. A.W.Patwardham
15	13CHE1011	MANGLE TANAYA PARAG	Population balance modeling for gas – liquid flow in pipes	Prof.A.W.Patwardham
16	13CHE1057	PATIL AKASH KAILAS	Recovery of Lithium from natural water bodies	Prof. A.W.Patwardham
17	13CHE1024	KULKARNI AMEYA NITIN RAJASHREE	Solvents for sustainable chemical processes.	Prof. B.N.Thorat
18	13CHE1026	PARAB JULI DATTARAM DIPTI	Recovery of Solvents in Pharmaceuticals Industries	Prof. B.N.Thorat
19	13CHE1041	PALEKAR AVANTI KIRAN ASWINI	Valorization of Spent Wash from molasses based distillation industries	Prof. B.N.Thorat
20	13CHE1053	DESHMANE SHUBHAM BHAUSAHEB VEENA	Salient Features of Qualitative and Quantative Risk Assessment in Chemical Plants	Prof. B.N.Thorat

21	13CHE1074	BABAR MAITREYA DAYANAND ROZA	Recovery of Barium Sulphate/Barium Carbonate from Brine Sludge	Prof. B.N.Thorat
22	13CHE1042	CHANDRA ADITYA GOPAL	Meshless methods for computational fluid dynamics	Dr. C.S.Mathpati
23	13CHE1043	DAVE VARUN TUSHAR	Multiscale modeling of granulation processes	Dr. C.S.Mathpati
24	13CHE1060	THAKARE KOMAL SANJAY	Principal component analysis of chemical process	Dr. C.S.Mathpati
25	13CHE1075	WAGHELA ROHAN SURESH	Latest developments in toxic gas scrubbing systems	Dr. C.S.Mathpati
26	13CHE1020	KORDE MADHULIKA SUBODH	Recent developments in supported trimetallic catalyst synthesis and applications	Prof. G.D.Yadav
27	13CHE1037	DEDHIYA VINIT KIRIT	Oxidation of methane to methanol	Prof. G.D.Yadav
28	13CHE1044	SHAH JIMISH VILAS	Challenges in manufacture of propylene oxide from propylene	Prof.G.D.Yadav
29	13CHE1061	NACHANEKAR ROHAN VAMAN	New methods of graphene oxide preparation and novel applications	Prof. G.D.Yadav
30	13CHE1073	KOTANGLE AVIRAL AJAY	Hybrid catalytic membrane reactors for chemical and biological processes	Prof. G.D.Yadav
31	13CHE1012	BHAGWAT SUYASH SUMANT	Kinetics of controlled release systems	Mrs. K.V.Marathe
32	13CHE1015	SARKAR KAUSTABH MANORANJAN	Photocatalytic membranes	Mrs. K.V.Marathe
33	13CHE1017	ZINZUWADIA MITHIL ANIRUDDHA	Design for disassembly	Mrs. K.V.Marathe
34	13CHE1030	PATIL VISHWAJEET RAJENDRA	Shape memory polymers	Mrs. K.V.Marathe
35	12CHE1059	PATIL CHINMAY SUNIL	Tannin-based bio-sorbents for environmental applications	Dr. P.D.Vaidya
36	13CHE1021	GODBOLE EESHANI PARESH	Biological treatment of landfill leachate	Dr.P.D.Vaidya
37	13CHE1038	ATTAL YOGESH GHANSHYAM	Hydrogels from cellulose and chitin	Dr. P.D.Vaidya
38	13CHE1050	JOGLEKAR CHAITANYA SANDEEP	Synthesis and applications of carbon nanosheets	Dr. P.D.Vaidya

39	13CHE1062	GAWANDE KAIVALYA PURUSHOTTAM	Pre-treatment technologies for cellulosic ethanol	Dr. P.D.Vaidya
40	12CHE1068	SABALE KIRAN BABURAO	Potential of CO <sub>2</sub> from flue gas as feedstock	Prof. P.K.Ghosh
41	13CHE1027	BHATAVDEKAR OMKAR MANDAR	Management of reject water from desalination plants	Prof. P.K.Ghosh
42	13CHE1045	DAVE DEEKSHA NIKHIL	Management of recalcitrant organics in effluent streams	Prof. P.K.Ghosh
43	13CHE1049	JAIN UJWAL ASHOK	Grey water recycle and reuse	Prof. P.K.Ghosh
44	13CHE1054	NAROTE VISHAL MAHESH	Metal recovery from spent catalysts	Prof. P.K.Ghosh
45	13CHE1004	SHAH MEET NITIN	Recent advances in application of ultrasound for membrane separations	Dr. P.R.Gogate
46	13CHE1016	GANJU SPARSH SUNIL	Recent advances in recovery of proteins from whey	Dr. P.R.Gogate
47	13CHE1036	SHIRODKAR ANIRUDDHA ATUL	Recent advances in treatment and recycle of domestic wastewater in small community areas	Dr. P.R.Gogate
48	13CHE1055	GUJRAL ROHAN SUMEET	Intensification of biofuels production from microalgae using cavitational reactors	Dr. P.R.Gogate
49	13CHE1013	SETHIA MADHAV RAMESH	Recent Advances in Reverse Osmosis Membranes	Dr.P.R.Nemade
50	13CHE1025	RAY PEARL PARTH SARATHI	Silicone Surfactants	Dr. P.R.Nemade
51	13CHE1065	PATEL MIT HARSHAD	Surface hydrophilization	Dr. P.R.Nemade
52	13CHE1076	BAGUL DIGVIJAY VASANT	Biocompatible surfactants	Dr. P.R.Nemade
53	13CHE1008	KUMAR ROHIT VIJAY	Recent advances and applications of screen printing	Dr. S.M.Sontakke
54	13CHE1009	PATIL YASH SUDHIR	Low-cost water softeners	Dr. S.M.Sontakke
55	13CHE1031	JANGAM KALYANI VIJAY	Current status of natural gas as a petrochemical feedstock	Dr. S.M.Sontakke
56	13CHE1056	TAYADE PRITESH SURESH	Development of chemosensors for gases	Dr. S.M.Sontakke
57	13CHE1010	PATANKAR VARAD VAIBHAV	Reclamation of waste foundry sand	Prof. S.S.Bhagwat
58	13CHE1034	GHOSH SUPRIYA SUNIL	Antimicrobial agents for personal care products	Prof. S.S.Bhagwat

## B.CHEM. ENGG. HOME PAPER 2016-17

Sr. No.	Roll No.	Name of Student	Topic	Guide
1	13CHE1003	GARG PARTH RAJIEEV	Design a plant to manufacture 10 TPD of sodium caseinate powder	Prof.A.B.Pandit
2	13CHE1008	KUMAR ROHIT VIJAY	Design a plant to manufacture 10 TPD of crystalline tri sodium phosphate	Prof.A.B.Pandit
3	13CHE1014	SAXENA AAYUSHI	Design a plant to manufacture 10 TPD of Ethoxylated Guar Gum	Prof.A.B.Pandit
4	13CHE1052	ASHLYN SAJEEV	Design a plant to manufacture 10 TPD of Carboxy Methyl Cellulose	Prof.A.B.Pandit
5	13CHE1074	BABAR MAITREYA DAYANAND	Design a plant to manufacture 10 TPD of veratrole	Prof.A.B.Pandit
6	13CHE1013	SETHIA MADHAV RAMESH	Design a plant to manufacture 10 TPD of L-carvone	Prof.A.M.Lali
7	13CHE1035	MUNGAD ADITYA ANIL	Design a plant to manufacture 50 TPD of green hydrogen	Prof.A.M.Lali
8	13CHE1057	PATIL AKASH KAILAS	Design a plant to manufacture 100 TPD of single cell oil	Prof.A.M.Lali
9	13CHE1060	THAKARE KOMAL SANJAY	Design a plant to manufacture 50 TPD green butadine	Prof.A.M.Lali
10	12CHE1059	PATIL CHINMAY SUNIL	Design a plant to manufacture 2-ethylhexyl glycerine	Prof.A.V.Patwardhan
11	13CHE1009	PATIL YASH SUDHIR	Design a plant to manufacture 3-chloro-1-propyne	Prof.A.V.Patwardhan
12	13CHE1023	SRIVASTAVA HURSHVARDHAN SANJAY	Design a plant to manufacture cyclopropyl amine	Prof.A.V.Patwardhan



13	13CHE1053	DESHMANE SHUBHAM BHAUSAHEB	Design a plant to manufacture 2,4 dichoro-5-fluoroacetophenone	Prof.A.V.Patwardhan
14	200901011018	PRANAV THORAT	Design a palnt to manufacture tallow fatty acids	Prof.A.V.Patwardhan
15	12CHE1074	HITESH IJJAPAWAR	Design a plant to manufacture 1000 TPA of 1-octanol	Prof.A.W.Patwardhan
16	13CHE1031	JANGAM KALYANI VIJAY	Design a plant to manufacture 1,6 hexane diol from glycerol	Prof.A.W.Patwardhan
17	13CHE1038	ATTAL YOGESH GHANSHYAM	Design a plant to manufacture 10000 TPA glyoxalic acid	Prof.A.W.Patwardhan
18	13CHE1050	JOGLEKAR CHAITANYA SANDEEP	Design a plant to manufacture 30000 TPA tertiary butyamine	Prof.A.W.Patwardhan
19	13CHE1073	KOTANGLE AVIRAL AJAY	Design a plant to manufacture 1 TPD triphenyl phosphine oxide	Prof.A.W.Patwardhan
20	12CHE1068	SABALE KIRAN BABURAO	Design a plant to manufacture 3000 TPA of hydrofluorolefin	Prof.B.N.Thorat
21	13CHE1010	PATANKAR VARAD VAIBHAV	Design a plant to manufacture 10 TPD of HPMC	Prof.B.N.Thorat
22	13CHE1061	NACHANEKAR ROHAN VAMAN	Design a plant to manufacture 10 TPM of phenylphrine	Prof.B.N.Thorat
23	13CHE1063	BHIRUD SHUBHAM HARSHAVARDHAN	Design a plant to manufacture 3000 TPA of 2 Methyl THF	Prof.B.N.Thorat
24	13CHE1026	PARAB JUILI DATTARAM	Design a plant to manufacture 40 TPA Valsartan	Dr.C.S.Mathpati
25	13CHE1033	PAWAR RITESH DINKAR	Design a plant to manufacture 2 TPA of sitagliptin malate	Dr.C.S.Mathpati

26	13CHE1046	PANDYA DARSHAN VIMAL	Design a plant to manufacture 10000 TPA of crotonaldehyde	Dr.C.S.Mathpati
27	13CHE1055	GUJRAL ROHAN SUMEET	Design a plant to manufacture 50TPA of Dimethyl fumarate	Dr.C.S.Mathpati
28	13CHE1066	SHENDE TUSHAR ARVIND	Design a plant to manufacture 300 TPA of ornidazole	Dr.C.S.Mathpati
29	13CHE1006	GUPTA RACHIT VINEY	Design a plant to manufacture 10 TPD 2, 3 lutidine	Prof.G.D.Yadav
30	13CHE1034	GHOSH SUPRIYA SUNIL	Design a plant to manufacture 5 TPD of 4-methoxyacetophenone	Prof.G.D.Yadav
31	13CHE1049	JAIN UJWAL ASHOK	Design a plant to manufacture 5000 TPA of p-toluidine	Prof.G.D.Yadav
32	13CHE1007	NAGPAL AMAN DEEP ANUP	Design a plant to manufacture zinc acetate	Mrs.K.V.Marathe
33	13CHE1021	GODBOLE EESHANI PARESH	Design a plant to manufacture of 5 TPD of dioctyl adipate	Mrs.K.V.Marathe
34	13CHE1019	GUPTA HANSIKA ARUN	Design a plant to manufacture cadmium nitrate tetrahydrate	Mrs.K.V.Marathe
35	13CHE1025	RAY PEARL PARTH SARATHI	Design a plant to manufacture 100 TPD of aluminium sulphate	Mrs.K.V.Marathe
36	13CHE1071	JADHAV AKSHAY BHALCHANDRA	Design a plant to manufacture 10 TPD of barium perchlorate	Mrs.K.V.Marathe
37	13CHE1004	SHAH MEET NITIN JAVER	Design a plant to manufacture 4000 TPD of Anthroquinone	Prof.Lakshmi Kantam
38	13CHE1062	GAWANDE KAIVALYA PURUSHOTTAM	Design a plant to manufacture 200 TPD of diacetone acrylamide	Prof.Lakshmi Kantam

39	13CHE1002	SHAH SOHAM EMIL	Design a plant to manufacture 500 TPA of benzonitrile	Dr.P.D.Vaidya
40	13CHE1037	DEDHIYA VINIT KIRIT	Design a plant to manufacture 1000 TPA of di-n-butyl ether	Dr.P.D.Vaidya
41	13CHE1054	NAROTE VISHAL MAHESH	Design a plant to manufacture 100 TPA of alpha-bisabolol	Dr.P.D.Vaidya
42	13CHE1068	DABHADE SHARVARI MAHESH	Design a plant to manufacture 100 TPA of N-acetyl-D-glucosamine	Dr.P.D.Vaidya
43	13CHE1012	BHAGWAT SUYASH SUMANT	Design a plant to manufacture 1 TPD agarose from G. dura seaweed	Prof.P.K.Ghosh
44	13CHE1018	KOTHARI RISHABH AJAY	Design a plant to manufacture 100 m <sup>2</sup> per day of high performance anion exchange membrane	Prof.P.K.Ghosh
45	13CHE1047	KANE ASHWIN ATUL	Design a plant to manufacture 3TPD fatty acid methyl ester from Jatropha fruit	Prof.P.K.Ghosh
46	13CHE1075	WAGHELA ROHAN SURESH	Design a plant to manufacture 1000 TPA of Tetrabromobisphenol A	Prof.P.K.Ghosh
47	13CHE1001	MEHTA OMKAR RAJENDRA	Design a plant to manufacture 1, 6 cleves acid	Dr.P.R.Gogate
48	13CHE1030	PATIL VISHWAJEET RAJENDRA	Design a plant to manufacture ethyl cyanoacetate	Dr.P.R.Gogate
49	13CHE1043	DAVE VARUN TUSHAR	Design a plant to manufacture 2,3 xyelnol	Dr.P.R.Gogate
50	13CHE1076	BAGUL DIGVIJAY VASANT	Design a plant to manufacture 3 hydroxy aceto phenone	Dr.P.R.Gogate
51	13CHE1005	DATAR ARCHIT NIKHIL	Design a plant to manufacture p-sulfoxy cinnamic acid	Dr.P.R.Nemade

52	13CHE1029	PATIL ADITYA NARENDRA	Design a plant to manufacture 1000 TPA of ofloxacin	Dr.P.R.Nemade
53	13CHE1032	RADADIYA HARDIK MUKESHBHAI	Design a plant to manufacture 10000 TPA of hydroxypropyl methylcellulose	Dr.P.R.Nemade
54	13CHE1056	TAYADE PRITESH SURESH	Design a plant to manufacture 100 TPA of ( R ) 3 acetyloxy -4-trimethyl ammonio-butanoate	Dr.P.R.Nemade
55	13CHE1024	KULKARNI AMEYA NITIN	Design a plant to manufacture 300 TPD of Caustic soda	Dr.S.M.Sontakke
56	13CHE1039	GOSAR RIJUL NARESH	Design a plant to manufacture 30TPD of 1, 2 Dichloroethane	Dr.S.M.Sontakke
57	13CHE1040	BHOSALE NANDINI DHANANJAY	Design a plant to manufacture 100 TPD of phosphorous trichloride	Dr.S.M.Sontakke
58	13CHE1044	SHAH JIMISH VILAS	Design a plant to manufacture 50000 TPA of Thionyl Chloride	Dr.S.M.Sontakke
59	13CHE1069	JADHAV VISHAL VASANTRAO	Design a plant to manufacture 30 TPD of stannous sulphate	Dr.S.M.Sontakke
60	13CHE1017	ZINZUWADIA MITHIL ANIRUDDHA	Design a plant to manufacture aspartame	Prof.S.S.Bhagwat
61	13CHE1028	PATEL VISHVA PRAMOD	Design a plant to manufacture chloranil	Prof.S.S.Bhagwat
62	13CHE1036	SHIRODKAR ANIRUDDHA ATUL	Design a plant to manufacture metronidazole	Prof.S.S.Bhagwat
63	13CHE1045	DAVE DEEKSHA NIKHIL	Design a plant to manufacture vinyl chloride monomer by carbide-acetylene route	Prof.S.S.Bhagwat

64	13CHE1058	ASUTKAR LAKSHYA SANJAY	Design a plant to manufacture dimethyl glycine	Prof.S.S.Bhagwat
65	13CHE1015	SARKAR KAUSTABH MANORANJAN	Design a plant to manufacture phthalic anhydride	Dr.S.S.Jogwar
66	13CHE1042	CHANDRA ADITYA GOPAL	Design a plant to manufacture vinyl acetate	Dr.S.S.Jogwar
67	13CHE1065	PATEL MIT HARSHAD	Design a plant to manufacture maleic anhydride	Dr.S.S.Jogwar
68	13CHE1070	GAIKWAD TANMAY ASHOK	Design a plant to manufacture dioctyl phthalate	Dr.S.S.Jogwar
69	12CHE1058	ADITYA ATALE	Design a plant to manufacture 5000 TPA of dimethyl disulfide	Prof.V.K.Rathod
70	13CHE1011	MANGLE TANAY PARAG	Design a plant to manufacture 1TPD of Bosentan	Prof.V.K.Rathod
71	13CHE1020	KORDE MADHULIKA SUBODH	Design a plant to manufacture 2 TPA of N Acetyl cystine	Prof.V.K.Rathod
72	13CHE1041	PALEKAR AVANTI KIRAN	Design a plant to manufacture 10 TPD anthranilic acid	Prof.V.K.Rathod
73	13CHE1064	KHEDKAR ATUL JAGDISH	Design a plant to manufacture 10 TPD of nitrobutyl benzene	Prof.V.K.Rathod
74	13CHE1016	GANJU SPARSH SUNIL	Design a plant to recover 1000 LPD of water from sea water using solar thermal system	Dr.V.H.Dalvi



## RESEARCH TOPICS (THESIS WORK): RESEARCH PROJECTS

### PH.D. (TECH)

No.	Research Scholar (Beginning with Last name)	Previous Institution	Project	Supervisor
1.	Tidke Vaibhav B.	Institute of Chemical Technology, Mumbai	Techno-commercial evaluation of sustainable technologies	Professor B.N. Thorat
2.	Rajput Shailendrasingh P.	Institute of Chemical Technology, Mumbai	Studies on development of fuel briquettes	Professor B.N. Thorat
3.	Shete Rahul T.	Institute of Chemical Technology, Mumbai	Microencapsulation by continuous process	Professor B.N. Thorat
4.	Bhadange Yogesh	Govt. Polytechnic, Thane	Sustainable Technologies	Professor B.N. Thorat
5.	Chavan Anand	Institute of Chemical Technology, Mumbai	Modeling, simulation and Exergy study of dryers	Professor B.N. Thorat
6.	Haramkar Shilpa	SGB, Amravati University	Dewatering waste activated sludge	Professor B.N. Thorat
7.	Kalpna Mahalle	UDCT, Jalgaon	Study of absorption cycle for power and refrigeration	Prof. S.S. Bhagwat
8.	Sudarshan Kalsulkar	Institute of Chemical Technology, Mumbai	Utilization of agricultural waste	Prof. S.S. Bhagwat
9.	Rahul Patil	Institute of Chemical Technology, Mumbai	Thermodynamics of Power Cycle	Prof. S.S. Bhagwat
10.	Swapnil Pakhale	Institute of Chemical Technology, Mumbai	Bioprocessing and purification of biomolecules from <i>Serratia marcescens</i>	Prof. S.S. Bhagwat
11.	Akshaya Chavan	Institute of Chemical Technology, Mumbai	Studies in Interfacial science	Prof. S.S. Bhagwat
12.	Amol Gore	UDCT, Jalgaon	Extraction of phytonutrients from vegetable oils	Prof. S.S. Bhagwat
13.	Bote Pravin P (left course)	Bharti Vidyapeeth CoE, Kharghar	Novel Reactor Design for synthesis of different oleochemicals	Prof. V.G. Gaikar
14.	Koli Aditya	Institute of Chemical Technology, Mumbai	Production of Valuable Chemicals from carbohydrates	Prof. V.G. Gaikar

15.	Sawant Vishal M.	UDCT, Jalgaon	Design and Process Intensification of Novel Extractants for Selective Separation of MetalIons	Prof. V.G. Gaikar
16.	Labrath Yogita	Institute of Chemical Technology, Mumbai	“Process intensification of extraction and isolation of natural products.”	Prof. V.G. Gaikar
17.	Rathi Noopur	Institute of Chemical Technology, Mumbai	Engineering aspects of synthesis of nanoparticles and pharmaceutical cocrystals in microreactor and continuous reactors.	Prof. V.G. Gaikar
18.	GabhaneSuchita T.	LIT	In situ Photocatalytic system for CO <sub>2</sub> conversion to valuable fuel	Prof. V.G. Gaikar
19.	Syed Tanweer Ahmed	LIT	Tea Components solubilization in water and thermodynamic studies of solubilization	Prof. V.G. Gaikar
20.	Kabade Ketan Balkrishna	Institute of Chemical Technology, Mumbai	Development of additive for use in Delayed Coker Unit (DCU) to improve liquid yield	Prof. V.G. Gaikar
21.	BhojeRutuja Sanjay	Dr. B.A.T.U	Design of in Situ Photocatalytic Systems for CO <sub>2</sub> Conversion into Useful OrganicMaterials Using CdS Nanoparticles on the New Polymeric CO <sub>2</sub> Specific Adsorbentsand/ graphene Supports	Prof. V.G. Gaikar
22.	Chatake Vikram S	LIT	Catalytic conversion of Biomass.	Prof. V.G. Gaikar
23.	Kausley Shankar	Institute of Chemical Technology, Mumbai	Development of Cost Effective Technologies for Reuse of Wastewater	Prof. A.B. Pandit
24.	Ketan Desai	Institute of Chemical Technology, Mumbai	Sustainable processes for the development of keratin hydrolysate for the use as fertilizer, animal feed and pet food	Prof. A.B. Pandit
25.	Karuna Nagula	Institute of Chemical Technology, Mumbai	Process intensification of enzymatic hydrolysis using various process intensification techniques	Prof. A.B. Pandit

26.	Yogesh Urunkar	L.I.T. Nagpur	Thermal efficiency improvements in solid fuel burning device	Prof. A.B. Pandit
27.	Zakir Hussain	U.D.C.T. N.M.U. Jalgaon	Modeling and simulation of solid fuel burning devices	Prof. A.B. Pandit
28.	Chandrakant Bhogle	U.D.C.T. N.M.U. Jalgaon	Depolymerisation of Post-consumer Poly(Ethylene Terephthalate) into value added products using cavitation phenomenon	Prof. A.B. Pandit
29.	Chandrakant Holkar	Institute of Chemical Technology, Mumbai	Development of sustainable processes for green environment	Prof. A.B. Pandit
30.	Ananda Jadhav	I.I.T. Roorkee	Cavitation assisted physico-chemical transformation for synthesizing materials at nanoscale	Prof. A.B. Pandit
31.	Sammit Karekar	V.I.T. Pune	Development of nanocontainer for performance based applications	Prof. A.B. Pandit
32.	Dipak Chandre	S.V.I.T.Nashik	Cavitation for wastewater treatment	Prof. A.B. Pandit
33.	Nilesh Rane	U.D.C.T. N.M.U. Jalgaon	Regeneration of sodium cold trap using surrogate system	Prof. A.B. Pandit
34.	Sarjerao Doltade	A.I.S.S.M.S.C.O.E. Pune	Development of CFD model to study the regeneration behavior of cold trap including passive heat transfer or surrogate system	Prof. A.B. Pandit
35.	Gaurav Dastane	Institute of Chemical Technology, Mumbai	Design of Cavitating Devices	Prof. A.B. Pandit
36.	Mayur Ladole	U.D.C.T. N.M.U. Jalgaon	Synthesis of Magnetic Nano supports for enzyme immobilization to study Biochemical transformations	Prof. A.B. Pandit
37.	Rutuja Kamble	T.K.I.E.T. Kolhapur	Novel methods to avoid the biofouling in Membrane Bioreactor (MBR)	Prof. A.B. Pandit

38.	Rahul Kulkarni	Institute of Chemical Technology, Mumbai	Design of cavitating devices for nanoemulsion	Prof. A.B. Pandit
39.	Priyanka Patil	Institute of Chemical Technology, Mumbai	CFD and experiments with packed bed catalytic systems	Prof. A.B. Pandit
40.	Ashish Yadav	Institute of Chemical Technology, Mumbai	Microbial enzyme based natural fiber (Ramie) finishing: an ecofriendly approach	Prof. A.B. Pandit
41.	Chakraborty Moushmi	LIT, Nagpur	Depolymerisation of lignin	Prof. A.M.Lali
42.	Savvashe Prashant	Institute of Chemical Technology, Mumbai	Scale up and kinetic studies of algae	Prof. A.M. Lali
43.	Mahale Jyoti	Indian Institute of Technology Kanpur	Synthesis of methyl ethyl ketone and butadiene from fermented 2,3 butanediol	Prof. A.M. Lali
44.	Pawar Pratik R.	UICT, NMU, Jalgaon	Continuous cultivation of thraustochytrides for microbial oil production	Prof. A.M.Lali
45.	Subramanian Sunu	A.C.Tech Campus, Anna University Chennai	Chromatographic Separation of Isomers	Prof. A.M. Lali
46.	Vasishta Ayush	SRM University, Chennai	Process scale up and reaction engineering for production of FDCA	Prof. A.M.Lali
47.	Hrushikesh Khadamkar	Institute of Chemical Technology, Mumbai	Computational Flow Modeling of Compressible Flow in Gas Centrifuge	Prof J. B. Joshi
48.	RamchandraPatil	Institute of Chemical Technology, Mumbai	Design of CPC for solar Thermal Systems	Prof J. B. Joshi
49.	Chaudhari Swapnil R. (Chemical Engineering)	Institute of Chemical Technology, Mumbai	Studies in advanced membrane separation processes	Prof. A.V. Patwardhan
50.	Kulkarni Vaishali M. (Bioprocess Technology)	Institute of Chemical Technology, Mumbai	Studies in development and application of microbial colorants / pigments	Prof. A.V. Patwardhan
51.	Prabhu Vandana (Chemical Engineering)	Institute of Chemical Technology, Mumbai	Synthesis of ceramic membranes and its applications	Prof. A.V. Patwardhan

52.	Thombre Nitin V. (Chemical Engineering)	I. S. M., Dhanbad	Studies in wastewater treatment using membranes separation	Prof. A.V. Patwardhan
53.	Rajput Swapnil (Chemical Engineering)	Institute of Chemical Technology, Mumbai	Development of grafted resins and membranes (extractants) for precious metals	Prof. A.V. Patwardhan
54.	Farakte Raosaheb	Institute of Chemical Technology, Mumbai	Transport Phenomena in Multiphase Processes	Prof. A.W. Patwardhan
55.	Sharma Anita (Co-supervised)	Institute of Chemical Technology, Mumbai	Synthesis of Carbon NanoTubes	Prof. A.W. Patwardhan
56.	Yadav Geeta (Co-supervised)	Dr. L.H. Hiranandani College of Pharmacy	Extraction and Formulation of Actives from Natural Materials	Prof. A.W. Patwardhan
57.	Sen Nirvik (registered at HBNI)	BARC	Pulsed Extraction Columns	Prof. A.W. Patwardhan
58.	Bapat Deepak	Institute of Chemical Technology, Mumbai	Thermodynamics of Extraction System	Prof. A.W. Patwardhan
59.	Yadav Manishkumar (Co-supervised)	IIT Gandhinagar	Synthesis and Characterization of Carbon NanoTubes and Fibres	Prof. A.W. Patwardhan
60.	Lote Dhiraj	IIT Guwahati	Studies on Extraction Processes	Prof. A.W. Patwardhan
61.	Tiwari Shashank (Co-supervised)	NIT Bhopal	DNS of Flow Patterns in Multi-Particle Systems	Prof. A.W. Patwardhan
62.	Mali Chaitanya	BATU	Modeling of Two Phase Flow Instability in Vertical Tube Boiling Evaporators	Prof. A.W. Patwardhan
63.	Hendre Nilesh	NIT Trichy	CFD Modeling of Assymetric RDC	Prof. A.W. Patwardhan
64.	Dhekne Pallavee	BATU	Modeling of Infusion and Leaching Processes	Prof. A.W. Patwardhan
65.	Ganjare Amol	Institute of Chemical Technology, Mumbai	Design Aspects of Gravity Settlers	Prof. A.W. Patwardhan
66.	Hinge Shruti	Institute of Chemical Technology, Mumbai	CFD Modeling of Gas-Liquid Stirred Tanks Reactors and Fermenters	Prof. A.W. Patwardhan
67.	Sawant Shrilekha (Co-Guide)	Institute of Chemical Technology, Mumbai	Synthesis and modification of carbon nanotubes: Experimentation and applications	Prof. A.W. Patwardhan



68.	Biranje Pratiksha (Co-Guide)	Institute of Chemical Technology, Mumbai	Synthesis and Application of Graphene	Prof. A.W. Patwardhan
69.	Vrushali Kulkarni	Institute of Chemical Technology	Study of Extraction and Downstream Processing of Biomolecules from Various Natural Sources	Prof. V. K. Rathod
70.	Niphadkar Sonali	Institute of Chemical Technology	Study of Extraction and Downstream Processing of Biomolecules of Therapeutic values from Various Natural Sources	Prof. V. K. Rathod
71.	Rao Priyanka	Bharati Vidyapeeth's College of Pharmacy	Study of Extraction and Downstream Processing of biomolecules of medicinal value from natural source	Prof. V. K. Rathod
72.	Pandhare Dhanashree	Institute of Chemical Technology	Studies in biocatalysis	Prof. V. K. Rathod
73.	Khan Nishat	Institute of Chemical Technology	Studies in enzyme catalyzed reactions	Prof. V. K. Rathod
74.	Rathod Wadilal Rohidas	Dr. BATU, Lonere -Raigad	Process Intensification studies using spinning disc reactor	Prof. V. K. Rathod
75.	PawarShwetaVitthal	DR. D. Y. Patil University, Navi Mumbai.	Fermentative production of a biomolecule.	Prof. V. K. Rathod
76.	Chavan Revati	Institute of Chemical Technology	Extraction of proteins from oil seeds	Prof. V. K. Rathod
77.	Bhagwat Komal	Institute of Chemical Technology, Mumbai	Extraction of medicinally important compounds from natural sources	Prof. V. K. Rathod
78.	Kavita Lanjekar	Institute of Chemical Technology, Mumbai	Extraction of biomolecules from natural sources	Prof. V. K. Rathod
79.	Prerna Tomke	Institute of Chemical Technology, Mumbai	Studies in enzyme catalyzed reactions	Prof. V. K. Rathod
80.	Shamraja Nadar	Institute of Chemical Technology, Mumbai	Studies in enzyme immobilization	Prof. V. K. Rathod
81.	Girish N	Institute of Chemical Technology, Mumbai	Studies in enzyme catalyzed reaction	Prof. V. K. Rathod
82.	Neha Gharat	Institute of Chemical Technology, Mumbai	Modeling studies in extraction of natural products	Prof. V. K. Rathod

83.	Sujata Patil	Institute of Chemical Technology, Mumbai	Extraction and purification of curcumin from turmeric	Prof. V. K. Rathod
84.	Dange Parmanand	AISSMS,Pune	Studies in biodiesel production	Prof. V. K. Rathod
85.	Shewale Sandip	TKIET, Warnanagar	Process intensification of extraction and purification of natural ingredients from herbs	Prof. V. K. Rathod
86.	ShivrajYadav	Fermentative production of bioethanol	Process intensification studies in ethanol production from waste	Prof. V. K. Rathod
87.	Meera Sose	Pravara Rural Engineering College	Process intensification studies in enzyme catalyzed reaction	Prof. V. K. Rathod
88.	Katyayini .T	Vellore Institute of Technology, Vellore	Studies in biomolecule extraction	Prof. V. K. Rathod
89.	PravinTadkar	Institute of Chemical Technology, Mumbai	Process intensification in chemical engineering reactions	Prof. V. K. Rathod
90.	Jawale Rajashree H.	Institute of Chemical Technology, Mumbai	Advanced oxidation processes based on cavitation for wastewater treatment	Dr. P.R. Gogate
91.	Mohod Ashish	Institute of Chemical Technology, Mumbai	Intensification of Chemical Processing Applications Using Cavitation Reactors	Dr. P.R. Gogate
92.	Barik Arati	National Institute of Technology, Rourkela	Combined Treatment Schemes based on Cavitation, Ozone and Photocatalysis for Wastewater Treatment	Dr. P.R. Gogate
93.	Bhandari Praveen	Institute of Chemical Technology, Mumbai	Intensified Industrial wastewater treatment	Dr. P.R. Gogate
94.	Joshi Saurabh	Institute of Chemical Technology, Mumbai	Improvements in biofuel synthesis from sustainable resources	Dr. P.R. Gogate
95.	More Nishant	Dr. Babasaheb Ambedkar Technological University, Lonere	Improvements in emulsification and oil processing using cavitation reactors	Dr. P.R. Gogate

96.	Ayare Sudesh	Dr. Babasaheb Ambedkar Technological University, Lonere	Improved oxidation treatment schemes for industrial effluent treatment	Dr. P.R. Gogate
97.	Jain Suyog Nandlal	UDCT, NMU, Jalgaon	Improved adsorption processes for removal of dyes from wastewater	Dr. P.R. Gogate
98.	Thanekar Pooja	Institute of Chemical Technology, Mumbai	Combined Oxidation Processes Based On Hydrodynamic Cavitation for Treatment of Waste Water Containing Pesticides and Emerging Contaminates	Dr. P.R. Gogate
99.	Khair Rajeshree	Institute of Chemical Technology, Mumbai	Intensified Recovery Of Valuable Products From Whey Using Ultrasound	Dr. P.R. Gogate
100.	Sabnis Sarvesh	Institute of Chemical Technology, Mumbai	Improved separations and cleaning using ultrasound	Dr. P.R. Gogate
101.	Sinhmar Pankaj	AISSMS, Pune	Intensification of chemical processing using cavitation reactors	Dr. P.R. Gogate
102.	Vinod Pakhale	Institute of Chemical Technology, Mumbai	Improved water and wastewater treatment using combination approaches	Dr. P.R. Gogate
103.	Sudhir Gandhi	LIT, Nagpur	Intensified production of biofuels from sustainable biomass sources	Dr. P.R. Gogate
104.	Karan Chavan	PhD(Tech)	Process Development in Membrane Separations	Mrs. K. V. Marathe
105.	Pranav Nakhate	PhD (Tech)	Process Intensification Studies of Bioelectrochemical Membrane Reactor	Mrs. K. V. Marathe
106.	Hrushikesh Patil	PhD(Tech)	Recycle and Reuse of membrane in waste water treatment	Mrs. K. V. Marathe
107.	Karemore Ashvin L.	BITS, Pilani	Development of catalyst for synthesis gas production via CO <sub>2</sub> reforming of methane	Dr. P. D. Vaidya
108.	Mrs. Joseph Elizabeth	Institute of Chemical Technology, Mumbai	Studies in reactive absorption of CO <sub>2</sub> by alkanolamines	Dr. P. D. Vaidya

109.	Bhosale Ghanshyam	Institute of Chemical Technology, Mumbai	Multiphase reactor design for wastewater treatment	Dr. P. D. Vaidya
110.	Ms. Barge Aditi	Institute of Chemical Technology, Mumbai	Studies in water purification	Dr. P. D. Vaidya
111.	Ms. Budhwani Neha	NIT, Raipur	Studies in reactive absorption	Dr. P. D. Vaidya
112.	Dewoolkar Karan	Institute of Chemical Technology, Mumbai	Sorption enhanced reforming reactions	Dr. P. D. Vaidya
113.	Patil Mayurkumar	UICT, Jalgaon	Discovery of novel absorbents for enhanced CO <sub>2</sub> capture	Dr. P. D. Vaidya
114.	Bhoite Ganesh M.	Institute of Chemical Technology, Mumbai	Pretreatment of biomethanated distillery waste by catalytic wet air oxidation to enhance further biomethanation	Dr. P. D. Vaidya
115.	Ghungrud Swapnil	UICT, Jalgaon	Studies in sorption enhanced reforming	Dr. P. D. Vaidya
116.	Shekhar Sawant	BATU, Lonere	Computational and Experimental Studies in Scale-Up of Multiphase Reactor	Dr. C.S.Mathpati
117.	Achyut Pakhre	Institute of Chemical Technology, Mumbai	Role of Fluid Mechanics and Supersaturation Fields on the Size Distribution and Morphology of Crystals	Dr. C.S.Mathpati
118.	Sandeep Gosavi	Institute of Chemical Technology, Mumbai	Computational and Experimental Study of Fluidization Phenomena	Dr. C.S.Mathpati
119.	Bhavesh Gajbhiye	Institute of Chemical Technology, Mumbai	Transport Phenomena at Solid-Fluid and Fluid-Fluid Interface: Computational Fluid Dynamics and Flow Visualization	Dr. C.S.Mathpati
120.	Yogesh Urankar	LIT, Nagpur	Thermal Efficiency Improvement in Solid Fuel Burning Device	Dr. C.S.Mathpati
121.	Harshawardhan Kulkarni	CMS, Pune	Computational techniques for corrosion erosion problems	Dr. C.S.Mathpati

122.	Sourabh Agarwal	Current institute: HBNI-IGCAR	Development of simulation code for the molten salt electrorefining of spent nuclear fuel	Dr. C.S.Mathpati
123.	Shivanand Teli	LIT Nagpur	Study of transport phenomena in multiphase reactor design by using computational tool	Dr. C.S.Mathpati
124.	Niraj Kulkarni	NIT Surat	Computational and Experimental Study of Fluidization Phenomena	Dr. C.S.Mathpati
125.	Naresh Hanchate	Institute of Chemical Technology, Mumbai	Experimental and Computational studies of gas solid systems	Dr. C.S.Mathpati
126.	Shrikant Mete	BATU, Lonere	Batch Scheduling and optimal control of energy integrated networks	Dr. C.S.Mathpati
127.	Parikshit Shahane	LIT, Nagpur	Robust design of mixed mode of heat integration in batch systems.	Dr. C.S.Mathpati
128.	Prachi Dwidmuthe	UDCT Jalgaon	Computational study of blood flow in human body	Dr. C.S.Mathpati
129.	Tukaram Shinde	LIT Nagpur	-	Dr. C.S.Mathpati
130.	Tukaram Shinde		Lagrangian Approach to Fluid Mechanics using the Voronoi Framework	Dr. V.H. Dalvi
131.	Deepak Bapat (co-guiding with Prof. A. W. Patwardhan)	Institute of Chemical Technology, Mumbai	Molecular Simulations of Biphasic and Confined Systems	Dr. V.H. Dalvi
132.	Sushil Chaudhari	NMU, Jalgaon	Development of metal oxide catalyst for environmental applications	Dr. P.R. Nemade
133.	Rahul Zambare	NMU, Jalgaon	Development of graphene oxide based materials for separations	Dr. P.R. Nemade
134.	Shivani Kulkarni	LIT, Nagpur	Development of silicone based gemini surfactants	Dr. P.R. Nemade
135.	Aniket Waval	Institute of Chemical Technology, Mumbai	Studies in crystallization for continuous synthesis of nanoparticles	Dr. P.R. Nemade



136.	Chaudhari Sushil	UDCT, NMU, Jalgaon	Catalytic studies in lowering of coke formation in non-oxidative methane reforming	Dr. P. R. Nemade / Dr. S. M. Sontakke
137.	Sane Priyanka	DBATU, Lonere	Development of catalysts for methane reforming	Dr. S. M. Sontakke / Dr. P. R. Nemade
138.	Tambat Sneha	Amravati University	Synthesis of Metal Organic Framework and its Application for harnessing Solar energy and Advanced Oxidation Processes	Prof. A.B. Pandit/ Dr. S. M. Sontakke
139.	Umale Sanjivani	NMU, Jalgaon	Studies on dye sensitized solar cell	Dr. S. M. Sontakke
140.	Sardare Mamta	MAE, Alandi	Visible light photocatalytic degradation studies	Dr. S. M. Sontakke
141.	Pofali Prasad	RMS College of Pharmacy, Bhanpura, Bhopal	Development and evaluation of Nanoplex for nucleic acid delivery	Dr. Ratnesh Jain
142.	Ghodke Sharwari	Institute of Chemical Technology, Mumbai	Synthesis of Cyclodextrin based polymer for delivery of therapeutic actives	Dr. Ratnesh Jain
143.	Dey Anomitra	Dr. D.Y. Patil University, Mumbai	Cellular and computational studies for nucleic acid-polymer complexes	Dr. Ratnesh Jain
144.	Dyawanapelly Sathish	NIPER, Rae Bariely	Intracellular delivery of nanoparticles for biomacromolecules	Dr. Ratnesh Jain
145.	Patil Saurabh	R.C. Patel Institute of Pharmaceutical Education and Research, Shirpur	Excipient Development for Pharmaceutical Dosage Forms	Dr. Ratnesh Jain
146.	Rohra Nanda	Institute of Chemical Technology, Mumbai	Development of sustainable process for recombinant protein formulation	Dr. Ratnesh Jain
147.	Gaikwad Ganesh	University Institute of Chemical Technology, North Maharashtra, Jalgaon	Topic Approval Pending	Dr. Ratnesh Jain

148.	Pandit Ashish	Bharati Vidyapeeth University, Navi Mumbai	Novel drug delivery system of chitosan oligomer developed using green approaches	Dr. Ratnesh Jain
149.	Karekar Sammit Ekanath	VIT, Pune	Development of Nanocontainer for performance based applications	Dr. D.V.Pinjari
150.	Jadhav Ananda Jaysing	IIT, Roorkee	Cavitation Induced Physico-Chemical Transformation for Synthesizing Materials at Nano scale	Dr. D.V.Pinjari
151.	Holkar Chandrakant Ramnath	ICT, Mumbai	Development of sustainable processes for green environment	Dr. D.V.Pinjari
152.	Chandre Dipak Karbhari	Sir Visvesvaraya Institute of technology	Waste water treatment by novel methods.	Dr. D.V.Pinjari

## PH.D. (SCIENCE)

No.	Research Scholar (Beginning with Last name)	Previous Institution	Project	Supervisor
153	Nagwekar Nupur N.	Mumbai University	Biochemical and Microbiological Analysis of Dried Agricultural and Marine Food Products	Prof. B.N. Thorat
154	Ahire Manisha	RYK Science college Nasik	Interfacial Science for greener synthesis methods	Prof. S.S. Bhagwat
155	Lokhande Kumudini	University of Mumbai	Synthesis and Characterization of surfactants derived from natural sources	Prof. S.S. Bhagwat
156	Desai Shobha	University of Mumbai	Study of Phase equilibria in surfactant solutions	Prof. S.S. Bhagwat
157	Kedar Vaibhav	Bhavan's College	Application of surfactant solution in petroleum industry	Prof. S.S. Bhagwat
158	Kotian Prashant	University of Mumbai	Mixed surfactant systems	Prof. S.S. Bhagwat
159	Parab Pallavi	R. N. Ruia college	Thermodynamics of Phase equilibria relevant for absorption cycles	Prof. S.S. Bhagwat

160	Bote Pravin P (left course)	Bharti Vidyapeeth CoE, Kharghar	Novel Reactor Design for synthesis of different oleochemicals	Prof. V.G. Gaikar
161	Koli Aditya	UICT	Production of Valuable Chemicals from carbohydrates	Prof. V.G. Gaikar
162	Sawant Vishal M.	UDC	Design and Process Intensification of Novel Extractants for Selective Separation of Metallons	Prof. V.G. Gaikar
163	Labrath Yogita	ICT	“Process intensification of extraction and isolation of natural products.”	Prof. V.G. Gaikar
164	Rathi Noopur	ICT	Engineering aspects of synthesis of nanoparticles and pharmaceutical cocrystals in microreactor and continuous reactors.	Prof. V.G. Gaikar
165	GabhaneSuchita T.	LIT	In situ Photocatalytic system for CO <sub>2</sub> conversion to valuable fuel	Prof. V.G. Gaikar
166	Syed Tanweer Ahmed	LIT	Tea Components solubilization in water and thermodynamic studies of solubilization	Prof. V.G. Gaikar
167	Kabade Ketan Balkrishna	ICT	Development of additive for use in Delayed Coker Unit (DCU) to improve liquid yield	Prof. V.G. Gaikar
168	BhojeRutuja Sanjay	Dr. B.A.T.U	Design of in Situ Photocatalytic Systems for CO <sub>2</sub> Conversion into Useful OrganicMaterials Using CdS Nanoparticles on the New Polymeric CO <sub>2</sub> Specific Adsorbentsand/ graphene Supports	Prof. V.G. Gaikar
169	Chatake Vikram S	LIT	Catalytic conversion of Biomass.	Prof. V.G. Gaikar
170	Dabir Tasneem	Wilson college	Thermodynamic studies of extraction and purification of phytochemicals from plant extract	Prof. V.G. Gaikar
171	Dubhashe Yogeshwar	UDC	Process intensification of Nitrogen Heterocycles	Prof. V.G. Gaikar

172	M K MuffidahK	Kerala	Synthesis and characterization of nanoparticles using alumina membrane as template.	Prof. V.G. Gaikar
173	Hiware Suwarna	S.S.G.M College	Green synthesis of organic specialty chemicals in aqueous solutions	Prof. V.G. Gaikar
174	PathanArif Khan (discontinued)	Poona college of art's, Commerce &Scienc, Pune	Under approval	Prof. V.G. Gaikar
175	Barkule Angad Babasaheb	Dr. B.A.M.U.	Selection and Regeneration of potential ionic liquid for hydro processing feed stocks	Prof. V.G. Gaikar
176	Abha Sahu	Bhilai Mahila Mahavidyalaya, Bhilai	Ultrasonication-assisted synthesis of eco-friendly nano chelating agent/ composites for waste water treatment	Prof. A.B. Pandit
177	Bhagwat Patil	Pratap College, Amalner	Ultrasound assisted physiochemical transformation from renewable sources	Prof. A. B. Pandit
178	Nilesh Jadhav	Pune University	Eco-friendly technologiesfor the synthesis of organicand inorganic materials	Prof. A. B. Pandit
179	Sneha Tambat	Amravati University, Amravati	Synthesis of MOF based photocayalyst	Prof. A. B. Pandit
180	Patil Mallikarjun	Solapur University, Sholapur	Recovery and transformation of lignin to value added products	Prof. A.M. Lali
181	Kavadia Monali	Mithibai College	Lipase mediated synthesis of designer lipids	Prof. A.M. Lali
182	Asodekar Bhupal	University of Mumbai	Isolation of cellulose from lignocellulosic feedstock and its catalytic conversion to platform chemicals	Prof. A.M. Lali
183	Singh Nitesh Kumar	UDC, University of Mumbai, Mumbai	Isolation, characterization and valorization of phenolics from lignocellulosic biomass	Prof. A.M. Lali
184	Sarnaik Aditya	Mumbai University	Genetic and growth engineering of cyanobacteria for the production of hydrocarbons	Prof. A.M. Lali

185	Dargode Priyanka	K.T.H.M. College, Nasik	Consortia design by bioaugmentation for improved anaerobic digestion	Prof. A.M. Lali
186	Gore Suhas	Pune University	Improved biogas production from complex substrates	Prof. A.M.Lali
187	Bellary Suveera	S.I.E.S College, Mumbai	Designing microbial conversion of lignin	Prof. A. M.Lali
188	Patil Parmeshwar	PAU, Ludhiana	Hemicellulose characterization & its relation to biomass deconstruction process	Prof. A.M. Lali
189	Upadhyay Priya	St. Xaviers College, Mumbai	Engineering Pseudomonas putida KT2440 for catechol biosynthesis using Lignocellulosic biomass hydrolysate	Prof. A.M. Lali
190	Khadye Vishwanath	V. G Vaze college	Production of Beta-glucosidase in Bacillus subtilis	Prof. A.M. Lali
191	More Pooja	The Institute of Science, Mumbai	Biphasic Fermentation for Triacyl Glycerol production from pretreated lignocellulosic biomass hydrolysates using mixed microbial cultures	Prof. A.M.Lali
192	Pandey Preeti	Savitribai Phule Pune University, Pune	Photocatalytic solar water splitting	Prof. A.M.Lali
193	Ukarde Tejas	Savitribai Phule University Pune, Pune	Catalytic thermo liquefaction of plastic waste	Prof. A.M.Lali
194	Rao S. P. Poornima	St. Xaviers College, Mumbai	Improved production of acetic acid by Escherichia coli and Moorella thermoacetica	Prof. A.M.Lali
195	Bhalerao Machhindra S. (Chemistry)	Padmashri Vikhe-Patil College of Arts, Commerce and Science, Pravaranagar, Maharashtra	Utilization of edible and non-edible oils for value added applications	Prof. A.V. Patwardhan



196	Kumbhaj Shweta (Chemistry)	Government Girls' Postgraduate College, Bilaspur, Guru Ghasidas University, Chhattisgarh	Studies in chemistry aspects of membrane separation and ceramic membrane synthesis	Prof. A.V. Patwardhan
197	Choughule Yogesh K. (Chemistry)	Institute of Science, Mumbai	Studies in organic reaction systems for chiral discrimination processes	Prof. A.V. Patwardhan
198	Kulkarni Ketan S. (Chemistry)	G. J. College, Ratnagiri, Mumbai University	Studies in ceramic membrane synthesis and applications	Prof. A.V. Patwardhan
199	Manjeshwari Sonar	Ruia College, Mumbai	Studies in extraction of biomolecules from natural sources	Prof. V. K. Rathod
200	Gadalkar Sagar	Ahmednagar College, Ahmednagar	Studies in process intensification of Biomolecules Extraction and Application	Prof. V. K. Rathod
201	Waghmare Govind	G. S. Gawande College Umarkhed	Utilization of waste cooking oil for useful products	Prof. V. K. Rathod
202	Bansode Sneha	University of Mumbai. Dept. of Chemistry	Studies in Enzyme catalyzed synthesis	Prof. V. K. Rathod
203	Gupta Anilkumar	VES college of Arts, Science and Commerce	Studies in biodiesel production	Prof. V. K. Rathod
204	Gawas Sarita Deepak	Mumbai University Sub-Centre, Ratnagiri	Studies in Process Intensification in Enzyme catalyzed Reaction.	Prof. V. K. Rathod
205	Yadav Suraj Vasantrao	University of Pune, Pune	Studies in synthesis and applications of heterogeneous catalyst	Prof. V. K. Rathod
206	Kajal Jaiswal	Institute of Chemical Technology	Studies in Enzyme Catalysis	Prof. V. K. Rathod
207	More Snehal	Institute of Chemical Technology, Mumbai	Improved Synthesis of Structured Triacylglycerols and their Applications	Dr. P.R. Gogate
208	Yadav Abhimanyu K.	I.Y. College, Mumbai	Sustainable H <sub>2</sub> production by catalytic reforming	Dr. P. D. Vaidya

209	Payal Dipak D.	Siddharth College, Mumbai	Destruction of chlorinated organics by catalytic hydrotreatment	Dr. P. D. Vaidya
210	Bhandare Sachin G.	University of Mumbai	Studies in catalytic hydrogenation	Dr. P. D. Vaidya
211	Vemula Shrikant.Y.	D.G. Ruparel College, Mumbai	Studies in advanced oxidation process	Dr. P. D. Vaidya
212	Patil Shailesh J.	C.K. Thakur College, Panvel	Renewable diesel via catalytic hydrotreatment of vegetable oil	Dr. P. D. Vaidya
213	Ms. Baviskar Chetana	UICT, Jalgaon	The steam reforming of bio-oil model compounds	Dr. P. D. Vaidya
214	Ms. Pachupate Nilam	University of Mumbai	Studies in wet air oxidation of nitrogen containing organic pollutants	Dr. P. D. Vaidya
215	Mr. Prabjna Babu	IIT, Bombay	Sorption-enhanced reforming reaction	Dr. P. D. Vaidya
216	Pradnya Ghoderao (co-guiding with Dr. Mohan Narayan)	Savitribai Phule, Pune university	Statistical Mechanics of Bulk Fluid Phases	Dr. V.H. Dalvi
217	Kiran Dhopte	Swami Ramanand Teerth Marathwada University, Nanded	Application of Graphene oxide as catalyst as well as catalyst support for various organic transformations	Dr. P.R. Nemade
218	Jyoti Ambre	Mumbai University	Environmental applications of graphene oxide and functionalized graphene oxide	Dr. P.R. Nemade
219	Jadhav Nilesh Lakshman	Pune University	Eco-friendly Technologies for the Synthesis of Organic and Inorganic Materials	Dr. D. V. Pinjari
220	Sayyad Anwar	Pune University	Studies of	Dr. D. V. Pinjari
221	Shyam Sunder Gupta	ICT	Catalytic conversion of biomass to chemicals	Prof. M. Lakshmi antam

## INTEGRATED PH.D.

Sr. No.	Research Scholar (Beginning with Last name)	Previous Institution	Project	Supervisor
222	Das Arijit	Heritage Institute of Technology, Kolkata	Metabolic & fermentation engineering of thermophilic microorganisms for the enhanced 2,3-Butanediol production	Prof. A.M. Lali
223	Jadhav Sachin	ICT, Mumbai	Dewatering waste activated sludge	Prof. B. N. Thorat

## M. TECH. / M.CHEM. ENG.

No.	Research Scholar (Beginning with Last name)	Previous Institution	Project	Supervisor
1	Ganesh Bhare	ICT, Mumbai	Design development & experimental Analysis of Industrial Dryer for Agri & Food Commodities	Professor B.N. Thorat
2	Sikarwar Arvind	IT-GGU, Bilaspur	Experimental Study and mathematical modelling of solar conduction dryer	Professor B.N. Thorat
3	Thombare Govind	Pravara Rural Engg. College Loni	Fundamentals of cake filtration	Professor B.N. Thorat
4	Kulkarni Ashwini	Sinhgad Collage, Pune	Effect of surface modification on evaporation of water from soil	Prof. S.S. Bhagwat
5	Bayas Pooja	BATU, Lonere	Thermodynamic aspects of mixed micellization of binary mixed surfactant system	Prof. S.S. Bhagwat
6	Pawar Anisha	BITS, Pilani, Goa	Molecular modeling in micellar media	Prof. S.S. Bhagwat
7	Chauhan Nandini	Government engineering college, Ujjain	Process design for epoxidation of aromatic derivatives for production of commodity chemicals	Prof. S.S. Bhagwat
8	Bhutkar Siddhant	Sinhgad college, Pune	Intensifying epoxidation by continuous process design	Prof. S.S. Bhagwat

9	Halwai Govind	NIT Agartala	Integration of heat based vapor absorption refrigeration system in dairy industry	Prof. S.S. Bhagwat
10	Sawant ShrilekhaVijaysinh	Dr. B.A.T.U	Aqueous solutions based synthesis	Prof. V.G. Gaikar
11	RamyaRamesh	SASTRA university, Tamilnadu	Enzymatic/ microbial Oxidation of HMF	Prof. V.G. Gaikar
12	Madhavan Ashwin	NIT	Simulation for optimization of Bitumen Oxidation Plant	Prof. V.G. Gaikar
13	Sonparote Harshit Sudhir	LIT	Catalytic upgrading of biomass to diesel.	Prof. V.G. Gaikar
14	Vamanan Vijayalakshmi	Sinhgad College of engineering	Continuous enzymatic conversion of 5-hydroxymethylfurfural (HMF) to Furan-2, 5-dicarboxylic acid (FDCA).	Prof. V.G. Gaikar
15	Datar Shreerang D.	Shivajirao S. Jondhale College ofEngineering	Intensification of catalytic reaction for synthesis of Benzothiazoleby using microwave	Prof. V.G. Gaikar
16	Pokhriyal Prashant	Bipin Tripathi Kumaon Institute of Technology, Uttarakhand	Flux balance analysis of microbial systems	Prof. A. M. Lali
17	Gotmare Akshay	Visvesvaraya National Institute of Technology (VNIT), Nagpur	Catalytic upgradation of biocrude oil for enhancing its blendability in transport fuel	Prof. A.M. Lali
18	Harsh Thakkar	I.C.T. Mumbai	Simulation and experimental validation of various cavitating device	Prof. A.B. Pandit
19	Anagha Hunoor	I.C.T. Mumbai	Harnessing energy from wastewater by use of microbial fuel cell	Prof. A.B. Pandit
20	Jayesh Mevada	B.K.M.G.P.C. Gujarat	Modified methods for cell disruption and purification of biomolecules	Prof. A.B. Pandit

21	Sumedh Devi	K.K. Wier Nashik	Optimization of thermodynamic cycles	Prof. A.B. Pandit
22	Viraj Khasgivale	Shivajira Jondhali College, Mumbai	Enzymatic modification of guar-gum	Prof. A.B. Pandit
23	Susheel Yadav	Shivajira Jondhali College, Mumbai	Filling of hairline crack in concrete block	Prof. A.B. Pandit
24	Gupta Radhish	NIT Jalandhar	Studies in water recovery from dye-containing aqueous effluents using membrane separation	Prof. A. V. Patwardhan
25	Ratrey Geetanjali	NIT Raipur	Studies in water recovery from dye-containing aqueous effluents using membrane separation	Prof. A. V. Patwardhan
26	Ekhande Shankesh B.	UDCT Jalgaon	Studies in water recovery from pesticide-containing aqueous effluents using membrane separation	Prof. A. V. Patwardhan
27	Muley Saurabh	Pt. Deendayal Petroleum University, Gandhinagar	Synthesis of dendrimers and polymer-inclusion membranes for metal recovery from wastewater	Prof. A. V. Patwardhan
28	Venkat Vaishali	Sastra University	Comparison of Liquid-Liquid Extraction systems	Prof. A.W. Patwardhan
29	Ramani Sudha	Banasthali University	Process Development for Recovery of Lithium from Seawater Bittern	Prof. A.W. Patwardhan
30	Bhushan Bamane	Process intensification: Anti solvent drug precipitation using spin disc Reactor	Datta Meghe College of Engineering	Prof. V. K. Rathod
31	Rahul Walwatkar	Process intensification of trehalose fatty acid ester	Shivajirao Jondhale College of engineering	Prof. V. K. Rathod
32	Prachi Sadawarte	Fishery waste utilization for extraction of natural products	Sharadchandraji Pawar College of Food Technology	Prof. V. K. Rathod
33	Avinash Deshmukh	Pfermentation and characterization of polyhydroxyalkanoate	Shri Bhagwan College of Pharmacy	Prof. V. K. Rathod



34	Dhairyashil Santre	CaO based catalyst for biodiesel production	MGM JNEC	Prof. V. K. Rathod
35	Manish Salgaonkar	Dual enzyme immobilization on metal organic framework	MGM College of Engineering	Prof. V. K. Rathod
36	Ketan Ingle	Pretreatment of lignocellulosic substrate for bioethanol production	Government college of Pharmacy	Prof. V. K. Rathod
37	Kasar Santosh	SND college of pharmacy, Aurangabad	Intensification of biodiesel from waste cooking oil	Dr. P. R. Gogate
38	Prabhuzantye Tejaswini	Maharashtra Institute of Pharmacy, Pune	Ultrasound assisted isolation and intensification of Whey proteins	Dr. P. R. Gogate
39	Chaudhari Prasad	MGM college of Engineering & Technology, Pune	Recovery of PGMs from secondary spent material sources	Dr. P. R. Gogate
40	Kashyap Shubham	DCRUST, Murthal	Study of non edible oils for biodiesel production by interesterification with ultrasonic assistance	Dr. P. R. Gogate
41	Sanaik Ketki	Dr. Babasaheb Ambedkar Technological University, Lonere	Cavitation assisted process intensification of heterogeneous reactions	Dr. P. R. Gogate
42	Oke Amogh	Vivekananda Education Society's College of Pharmacy, Mumbai	Stabilization of waste water and sludge	Dr. P. R. Gogate
43	Dhaktode Mayuri	Sinhagad College of engineering, Pune	Degradation of PU foam by enzyme intensification	Dr. P. R. Gogate
44	Gadhekar Amit	Anuradha Engineering college, Chikli, Maharashtra	Cleaning of fouled membrane using cavitation	Dr. P. R. Gogate
45	Singh Shruti	ICT, Mumbai	UV-assisted surface modification of ultrafiltration polyethersulfone (PES) membranes.	Mrs. K.V. Marathe

46	Hatewar Akshay	L.I.T., Nagpur	PVDF Membrane production and Surface modification using photocatalyst	Mrs. K. V. Marathe
47	Belsare Makrand	LIT, Nagpur	Renewable diesel via catalytic hydrotreatment of vegetable oil	Dr. P. D. Vaidya
48	Ms. Sakhare Swati	VIT, Pune	Modelling of reactive adsorption process	Dr. P. D. Vaidya
49	Ms. Kumbhare Nikhita	LIT, Nagpur	Thermodynamic Modelling for hydrogen production	Dr. P. D. Vaidya
50	Chinthapandu Prashanth	RGUKT, Telangana	Reverse Water Gas Shift	Dr. P. D. Vaidya
51	Goyal Pranav	Amity Univ., Rajasthan	Renewable diesel via catalytic hydrotreatment of vegetable oil	Dr. P. D. Vaidya
52	Joshi Bhagyashree	UDCT, Amravati	Aqueous Phase Reforming	Dr. P. D. Vaidya
53	Maheshwari Gulshan	NIT suratlkhal	Energy spectra and CFD analysis of pump sump systems	Dr. C. S. Mathpati
54	Pramod Gawal	LIT, Nagpur	Advanced oxidation process for degradation of dye effluents	Dr. P. R. Nemade
55	Akshita Mogaveera	Datta Meghe College of Engg., Airoli	Electro activation of carbon di oxide	Dr. P. R. Nemade
56	Romil Shendre	Kolhapur Institute of Technology	Extraction of papain from pineapple wastes	Dr. P. R. Nemade
57	Rasika Mhetre	MGM College of Engg & Technology	Development of electrochemical sensors	Dr. P. R. Nemade
58	Pratiksha Pawar	MGM College of Engg & Technology	Studies of draw solution for fruit juice concentration using forward osmosis	Dr. P. R. Nemade
59	Shahista Khan	Datta Meghe Coleege of Engg., Airoli	Conversion of carbon di oxide to formaldehyde	Dr. P. R. Nemade
60	Gauri Thapa	Bharte Vidyapeeth College of Engg., Kharghar	Hydrophilization of membranes for oil-water separations	Dr. P. R. Nemade
61	Shashank Mhatre	BATU	Development of silicone surfactants	Dr. P. R. Nemade

62	Kanchana Ramesh	AISSMS, Pune	Development of superhydrophobic surfaces for oil-water separations	Dr. P. R. Nemade
63	Kapil Palasagar		Extraction of curcumin from unblanched turmeric	Dr. P. R. Nemade
64	Avinash P. Bari	UICT, Jalgaon	Synthesis of Alkyl polyglucosides & it's application	Dr. D. V. Pinjari
65	Prashant C. Hendre	VNMAU, Parbhani	Preparation of Essential oil nanoemulsions & it's application Past Institute : College of Food Technology	Dr. D. V. Pinjari
66	Abhijeet Goswami	T.K.I.E.T, Warananagar	Synthesis of organosilicon surfactant	Dr. D. V. Pinjari
67	Sai Krishna C Sastry	SASTRA university	Synthesis of Silver Nanoparticles using Sunlight	Dr. D. V. Pinjari
68	Pranit Patil	Department of Technology, Shivaji University, Kolhapur	Synthesis and Application of Triacetin	Dr. D. V. Pinjari
69	Sharvari Desai	KIT's College of Engineering, Kolhapur	Novel methods for extraction of perfumery or flavour compounds	Dr. D. V. Pinjari
70	Dipak Pukale	ICT, Mumbai	synthesis and application of silicone surfactant	Dr. D. V. Pinjari
71	Aditya Deshpande	University department of chemical technology, Aurangabad	Development of micro/ nano emulsions by innovative methods	Dr. D. V. Pinjari
72	Ankita Gawas	SIES, Nerul	Biosorption of Vanadium using abscised coconut leaves powder	Dr. Jyoti Sontakke
73	Vasudha Borkar	Sharad Pawar College of Pharmacy, Nagpur	Production of $\alpha$ -Rhamnosidase from <i>Aspergillus niger</i>	Dr. Jyoti Sontakke
74	Nitin Sagle	MGM College of Engineering, Kharkar	Development of functional food with fermented Sangri seed flour	Dr. Jyoti Sontakke
75	Rituparna Ghosh(HBNI)	University of Calcutta	Absorption of NOx	Prof. J. B. Joshi

76	Vishwakarma Rakhi S.	ICT mumbai	C-H activation by heterogeneous catalyst	Prof. M. Lakshmi Kantam
77	Tembhekar Kashish V.	ICT Mumbai	Catalytic synthesis of FDCA from HMF	Prof. M. Lakshmi Kantam

## DETAILS OF POST-GRADUATE STUDENTS WHO PASSED OUT MASTERS:

Sr. No.	Name	Course	Title	Supervisor
1.	Deshmukh Aditya	M.Chem. Engg.	Microwave vacuum puffing of food products and novel dryer design	Prof. B. N. Thorat
2.	Kamble Aditya	M. Tech.	Drying characteristics and analysis of jiggery and selected starch	Prof. B. N. Thorat
3.	Wagh Ashwin	M. Tech.	The study of drying in bioprocessing of biomaterials and agri-waste	Prof. B. N. Thorat
4.	Kulkarni Ashwini	M.Tech.	Effect of surface modification on evaporation of water from soil	Prof. S. S. Bhagwat
5.	Bayas Pooja	M.Chem. engg.	Thermodynamic aspects of mixed micellization of binary mixed surfactant system	Prof. S. S. Bhagwat
6.	Pawar Anisha	M.chem. Engg.	Molecular modeling in micellar media	Prof. S. S. Bhagwat
7.	Meshram Pawan	M.Tech.	Studies in Adsorption of cadmium (II) by surface modified biosorbent	Prof. S. S. Bhagwat
8.	Sreenivasan Shравan	M.Tech (BPT)	Catalytic liquefaction of municipal solid waste for generation of energy dense biocrude oil	Prof. A. M. Lali
9.	Bhatnagar Udit	M.Chem. Engg.	Flow Instability in Two Phase Flow	Prof. A. W.Patwardhan
10.	Sutar Sharvari	M.Chem. Engg.	Residence Time Distribution in ARDC	Prof. A. W.Patwardhan
11.	Ankit Sharma	M Chem	Improvements in crystallization of pharmaceutical drugs using ultrasound	Dr. P. R. Gogate
12.	Rohini Ambati	M Chem	Ultrasound Assisted Synthesis of Photocatalyst and its subsequent application in Dye Degradation	Dr. P. R. Gogate
13.	Leena Patil	M Chem	Ultrasound assisted synthesis of stable oil in milk emulsion: study of operating parameters and scale-up aspects	Dr. P. R. Gogate

14.	Rucha Patil	MTech BPT	Intensification of Enzymatic hydrolysis of	Dr. P. R. Gogate
15.	Monica Diwathe	MTech Green Tech.	Ultrasound assisted synthesis of 1-benzyloxy-4-nitrobenzene in presence of phase transfer catalyst	Dr. P. R. Gogate
16.	Pradhuma Sapkal	M Chem Engg	Treatment of Textile Wastewater using Membrane Bioreactor	Mrs. K. V. Marathe
17.	Neha Masram	M Chem Engg	Degradation of Sodium Dodecyl Sulfate (SDS) by Membrane Bioreactor	Mrs. K. V. Marathe
18.	Mousiq Wasi	M Chem Engg	Use of Micellar Enhanced Ultrafiltration for removal of Diclofenac Sodium from Wastewater	Mrs. K. V. Marathe
19.	Aniket Jadhav	M.Chem Engg	Use of Ultrafiltration for selective separation of organic compounds from Wastewater	Mrs. K. V. Marathe
20.	Shruti Singh	M.Chem Engg	UV-assisted surface modification of ultrafiltration polyethersulfone (PES) membranes.	Mrs. K. V. Marathe
21.	Sajanikar Ajinkya	M. Chem. Engg.	Study of CO <sub>2</sub> capture by reactive absorption	Dr. P. D. Vaidya
22.	Tongle Aniket	M. Chem. Engg.	Gas liquid mass transfer	Dr. P. D. Vaidya
23.	Pawar Chetan	M.Tech. Green Tech.	Study of aqueous phase hydrogenation of bio-oil derived model	Dr. P. D. Vaidya
24.	Chandole Akash	M.Tech. Green Tech.	Catalytic hydrotreatment of vegetable oils to produce renewable diesel	Dr. P. D. Vaidya
25.	Kumbhare Nikhita	M.Tech. Green Tech.	Thermodynamic Modelling for hydrogen production	Dr. P. D. Vaidya
26.	Kapanis Gaurav	M.Tech. (Bioprocess Technology)	Conversion Of Chitosan Into Its Soluble Derivatives With Improved Properties	Dr. R. D. Jain
27.	Manasi Inamdar	M.Tech. (Bioprocess Technology)	Production and characterization of low molecular weight chitosan from fungal mycelia	Dr. R. D. Jain
28.	Patil Ajinkya	M.Chem	Engineering non-spherical nanoparticles for biomedical applications	Dr. R. D. Jain



29.	Shitole Mayur	M.Tech Green Technology	Development of DNA Staining dye for quantitative analysis	Dr. R. D. Jain
30.	Chavan Kirti	M.Tech Perfumery and Flavor Technology	Development and Characterization of controlled release systems for fragrances	Dr. R. D. Jain
31.	Mahesh Tambe	M.Tech (Bioprocess Technology)	Characterization and stabilization of aggregated protein solution	Dr. R. D. Jain
32.	Meghna Suvarna	M.Tech Green Technology	Characterization of protein nanoparticle interaction	Dr. R. D. Jain
33.	Harshal Ghodmare	M.Chem	Modelling controlled release behavior of silver from polymeric scaffold	Dr. R. D. Jain
34.	Aditya Deshpande	M.Tech	Development of micro/nano emulsions by innovative methods	Dr. D. V. Pinjari
35.	Sharvari Desai	M.Tech	Novel methods for extraction of perfumery or flavour compounds	Dr. D. V. Pinjari
36.	Pranit Patil	M.Tech.	Synthesis and Application of Triacetin	Dr. D. V. Pinjari
37.	Dipanshu Garg	M.Tech. FBT	Development of Functional Food Ingredients using Prosopis Cineraria	Dr. Jyoti Sontakke-Gokhale
38.	Sushil Rathi	M.Tech. BPT	Numerical Studies of Anaerobic Digester and Process Optimization	Dr. Jyoti Sontakke-Gokhale
39.	Awate Vedraj	M Chem Eng	Synthesis, characterization and application of conductive polymers	Dr. S.M. Sontakke
40.	Katke Prashant	M Chem Eng	Combustion synthesis of ITO	Dr. S.M. Sontakke

### PH.D.(TECH/SCI)

Sr. No.	Name	Course	Title	Supervisor
41.	Arora Jyotsna	Ph.D. (Tech)	Separation of metal ions using molecular modeling and process intensification of the macrocyclic ligands	Prof. V.G. Gaikar
42.	Singh Meena B	Ph.D. (Tech)	Molecular Dynamic study of metal ions and design of ligand for metal extraction	Prof. V.G. Gaikar
43.	Pednekar Mukesh	Ph.D. (Tech.)	Controlled chemo-enzymatic hydrolysis of polysaccharides	Prof. A. M. Lali

44.	Rao Suruchi	Ph.D. (Tech.)	Cloning, expression and functional characterization of cellulose specific carbohydrate binding modules (CBMs)	Prof. A. M. Lali
45.	Rathod Jayant	Ph.D. (Sci.)	Molecular cloning, overexpression of stress responsive genes in microalgae under high light conditions for improved growth	Prof. A. M. Lali
46.	Gangal Swanand	Ph.D.(Sci.)	Designing strategies to improve microalgal lipid production for biofuels	Prof. A. M. Lali
47.	Deb Shalini	Ph.D. (Sci)	Construction of genome editing tools and metabolic engineering of escherichia coli for production of isobutanol	Prof. A. M. Lali
48.	Shukla Hiral	Ph.D. (Sci)	Integrative butanol fermentation	Prof. A. M. Lali
49.	Nivarutti Patil	Ph.D. (Tech)	Process Intensification using Advanced Membrane Separation Processes	Prof. A. W. Patwardhan
50.	Ajay Sharma	Ph.d. (Tech)	Advanced Membrane Separation Processes	Prof. A. W. Patwardhan
51.	Deepankar Sharma (Co-Guided)	Phd. (Tech)	Jet Loop Reactors: Hydrodynamic Characteristics and Design	Prof. A. W. Patwardhan
52.	Amrutlal Prajapat	PhD (sci)	Studies in polymer degradation using ultrasound based treatment approaches	Dr. P. R. Gogate
53.	Karan Chavan	PhD(Tech)	Process Development in Membrane Separations	Mrs. K. V. Marathe
54.	Amar Vibhandik	PhD(Tech)	Studies in Environmental Engineering for the treatment of aqueous industrial waste	Mrs. K. V. Marathe
55.	Pranav Nakhate	PhD (Tech)	Process Intensification Studies of Bioelectrochemical Membrane Reactor	Mrs. K. V. Marathe
56.	Karemore Ashvin	PhD (Tech) Chem Engg	Development of catalyst for synthesis gas production via CO <sub>2</sub> reforming of methane	Dr. P. D. Vaidya
57.	Hrushikesh Khadamkar	Ph.D. Tech	Studies in liquid-liquid extraction: Marangoni convection	Dr. C. S. Mathpati
58.	Sharma Anita	PhD (Tech) Chem. Engg.	Synthesis of Carbon Nanotubes	Prof. J.B.Joshi

## LIST OF SUMMER TRAINEE 2016

Sr. No	Name of Students	Institute
1	Mr. Shrikant Dongare	Dr. Babasaheb Ambedkar Technological University
2	Mr. Kaushal Kothari	SRM University
3	Ms. Noopur Walve	Dr. Babasaheb Ambedkar Technological University
4	Mr. Mayur Bhongade	Dr. Babasaheb Ambedkar Technological University
5	Mr. Mahesh Agrawal	Birla Institute Of Technology And Science, Pilani
6	Ms. Snehal Ghutugade	Dr. Babasaheb Ambedkar Technological University
7	Ms. Mrunal Salvi	Datta Meghe College of Engineering
8	Ms. Bhavika Pallan	PIET, Nagpur
9	Ms. Sonali Thawrani	PIET, Nagpur
10	Mr. Rakesh Ambildhuke	BATU, Lonere
11	Mr. Gaurav Sen	National Institute Of Technology, Durgapur
12	Ms. Mukta Tripathy	Manipal Institute of Technology, Manipal
13	Mr. Aritra Bhattacharya	National Institute of Technology, Warangal
14	Mr. Rohit K.R.	SSN College of Engineering
15	Ms. Maitri Uppaluri	R.V. College of Engineering
16	Mr. Kamesh Chikhale	Dr. Babasaheb Ambedkar Technological University
17	Ms. Saumya Mohapatra	IIT, Kharakpur
18	Mr. Akhilesh Malge	MIT, AOE
19	Ms. Priyanka Surendra	BMS College of Engineering
20	Mr. Kiran Mhaske	AISSMS, Pune
21	Ms. Anushka Patel	ISM, Dhanbad
22	Mr. Delton Mascarenhas	AISSMS, Pune
23	Mr. Aniket Mali	AISSMS, Pune
24	Mr. Adit Chawdhary	MIT, Manipal
25	Mr. Vikas Vale	IIT, BHU

## DETAILS OF SPONSORED PROJECTS

### GOVERNMENT AGENCIES:

No.	Research Scholar	Previous Institution
1	Sponsor	Rajiv Gandhi Commission for S&T, Government of Maharashtra
	Title	Jaggery Granulation
	Duration	18 months
	Total amount	1 Crore
	Principal Investigator	Prof. B. N. Thorat

	Research Fellows	Anand Chavan
2	Sponsor	Rajiv Gandhi Commission for S&T, Government of Maharashtra
	Title	Cold Storage Facility for Post Harvest Preservation of Fruits And Vegetables Using Solar and Biomethane Heat Based Refrigeration
	Duration	5 Years
	Total amount	
	Principal Investigator	Prof. S. S. Bhagwat
	Research Fellows	Kalpana Mahalle, Pallavi Parab
3	Sponsor	Department of Atomic Energy/ Knowledge Based Engineering Centre
	Title	Design of novel extractants by molecular modeling for heavy metal ions
	Duration	5 years
	Total amount	84.4 lacs
	Principal Investigator	Prof V. G. Gaikar
	Research Fellows	Vishal M.Sawant (Ph.D. (T))
4	Sponsor	Bharat Petroleum Corporation Limited
	Title	Selection and Regeneration of potential ionic liquid for hydroprocessing feed stocks
	Duration	2015-2017
	Total amount	50,00,000 Rs
	Principal Investigator	Prof. V G Gaikar
	Research Fellows	Barkule Angad Babasaheb(Ph.D. (Sci))
5	Sponsor	Bharat Petroleum Corporation Limited
	Title	Development of additive for use in Delayed Coker Unit (DCU) to improve liquid yield
	Duration	2015-2017
	Total amount	Kabade Ketan Balkrishna
	Principal Investigator	Prof. V G Gaikar
	Research Fellows	(Ph.D. (Tech))
6	Sponsor	Department of Science and Technology, Science and Engineering Research Board
	Title	Design of in situ photocatalytic systems for CO <sub>2</sub> conversion into useful organic materials using CdS Nanoparticles on the new polymeric CO <sub>2</sub> specific adsorbents and graphene supports
	Duration	3 years
	Total amount	Rs.54,80,900
	Principal Investigator	Prof. V G Gaikar
	Research Fellows	Ms.M.Muffidah(Ph.D. (Sci)), MsGabhaneSuchita(Ph.D. (T)) and Ms. BhojeRutuja(Ph.D. (T))

7	Sponsor	Department of Atomic Energy/ Knowledge Based Engineering Centre
	Title	Design of novel extractants by molecular modeling for heavy metal ions
	Duration	5 years
	Total amount	84.4 lacs
	Principal Investigator	Prof V. G. Gaikar
	Research Fellows	Vishal M.Sawant (Ph.D. (T))
8	Sponsor	Bharat Petroleum Corporation Limited
	Title	Selection and Regeneration of potential ionic liquid for hydroprocessing feed stocks
	Duration	2015-2017
	Total amount	50,00,000 Rs
	Principal Investigator	Prof. V G Gaikar
	Research Fellows	Barkule Angad Babasaheb(Ph.D. (Sci))
9	Sponsor	Bharat Petroleum Corporation Limited
	Title	Development of additive for use in Delayed Coker Unit (DCU) to improve liquid yield
	Duration	2015-2017
	Total amount	Kabade Ketan Balkrishna
	Principal Investigator	Prof. V G Gaikar
	Research Fellows	(Ph.D. (Tech))
10	Sponsor	Department of Science and Technology, Science and Engineering ResearchBoard
	Title	Design of in situ photocatalytic systems for CO <sub>2</sub> conversion into useful organic materials using CdS Nanoparticles on the new polymeric CO <sub>2</sub> specific adsorbents and graphene supports
	Duration	3 years
	Total amount	Rs.54,80,900
	Principal Investigator	Prof. V G Gaikar
	Research Fellows	Ms.M.Muffidah(Ph.D. (Sci)), MsGabhaneSuchita(Ph.D. (T)) and Ms. BhojeRutuja(Ph.D. (T))
11	Sponsor	DBT-ICT Centre for Energy Biosciences (CEB) Technology
	Title	Turning distillery solid waste into energy
	Duration	
	Total amount	1045.72
	Principal Investigator	
	Research Fellows	
12	Sponsor	DBT-

	Title	Biphasic fermentation for triacyl glycerol (TAG) production from pretreated lignocellulosic biomass
	Duration	2017-2020
	Total amount	39.84
	Principal Investigator	
	Research Fellows	
13	Sponsor	DBT-CEB-BIPP
	Title	Pilot scale translational facility for value added chemicals from biomass
	Duration	2016-2017
	Total amount	50.00
	Principal Investigator	
	Research Fellows	
14	Sponsor	DBT, India
	Title	Biphasic fermentation for triacyl glycerol (TAG) production from pretreated lignocellulosic biomass
	Duration	2017-2020
	Total amount	39.84
	Principal Investigator	
	Research Fellows	
15	Sponsor	DBT-CEB-BIPP
	Title	Pilot scale translational facility for value added chemicals from biomass
	Duration	2016-2017
	Total amount	50.00
	Principal Investigator	
	Research Fellows	
16	Sponsor	DST-KGDS
	Title	Performance and durability improvements in the solar thermal desalination system at Narippaiyur and utilization of reject sea water for algae cultivation to produce biogas
	Duration	2015-2018
	Total amount	61.35
	Principal Investigator	
	Research Fellows	
17	Sponsor	DBT-AISRE, India
	Title	Integrated biorefinery for production of sorghum Grain protein Phase II
	Duration	2015-2017



	Total amount	113.74
	Principal Investigator	
	Research Fellows	
18	Sponsor	IGSTC,DST, India
	Title	Design of selective nanoporous membrane bioreactor for efficient production of bio-butanol from lignocellulosic sugar (SeNaMeB)
	Duration	2014-2017
	Total amount	115.40
	Principal Investigator	
	Research Fellows	
19	Sponsor	DST, India
	Title	Green enzymatic fat-splitting technology for production of fatty acids and Acyl Glycerols
	Duration	2014-2017
	Total amount	847.53
	Principal Investigator	
	Research Fellows	
20	Sponsor	DSIR,DST, India
	Title	Macroalgal biorefinery for CO <sub>2</sub> sequestration and production of biofuel and value added compounds
	Duration	2014-2016
	Total amount	85.00
	Principal Investigator	
	Research Fellows	
21	Sponsor	DBT, India
	Title	DBT-ICT Centre for Energy Biosciences: New and extension proposals
	Duration	2013-2018
	Total amount	1763.26
	Principal Investigator	
	Research Fellows	
22	Sponsor	MNRE, India
	Title	Improved production of biogas and bio-CNG from lignocellulosic biomass
	Duration	2013-2016
	Total amount	267.16
	Principal Investigator	
	Research Fellows	
23	Sponsor	DBT- BBSRC/ SuBBSa

	Title	Transnational approaches to resolving biological bottlenecks in macroalgal biofuel production
	Duration	2014-2017
	Total amount	201.672
	Principal Investigator	
	Research Fellows	
24	Sponsor	DBT- BBSRC/ Ricefuel
	Title	Engineering enzymes, bacteria and bioconversion processes for advanced biofuels from waste grain straw
	Duration	2013-2016
	Total amount	152.00
	Principal Investigator	
	Research Fellows	
25	Sponsor	AISRF Indo-Australia Grand Challenge Program, DST, India
	Title	Integrated technologies for economically sustainable bio-based Energy
	Duration	2014-2017
	Total amount	700.30
	Principal Investigator	
	Research Fellows	
26	Sponsor	DBT, India
	Title	Development and characterization of alternative affinity adsorbent for purification of therapeutic antibodies
	Duration	2013-2016
	Total amount	68.468
	Principal Investigator	
	Research Fellows	
27	Sponsor	DBT, India
	Title	Energy Biosciences Overseas Fellowship & Chairs
	Duration	2009-2020
	Total amount	1472.21
	Principal Investigator	
	Research Fellows	
28	Sponsor	Microbial enzyme based natural fiber (Ramie) finishing: an ecofriendly approach
	Title	DBT under Twinning Program
	Duration	Rs. 35 lacs
	Total amount	Prof. A.B. Pandit

	Principal Investigator	2016 – 2019
	Research Fellows	Mr. Ashish Yadav
29	Sponsor	Indira Gandhi Center for Atomic Research (IGCAR)
	Title	Characterization of the regeneration process for liquid sodium cold trap in secondary system of fast
	Duration	Rs. 38 lacs
	Total amount	Prof. A.B. Pandit
	Principal Investigator	2015 – 2018
	Research Fellows	Mr. Sarjerao Doltade and Mr. Nilesh Rane
30	Sponsor	Department of Science and Technology, Government of India
	Title	Sustainable processes for the development of keratin hydrolysate for the use as fertilizer, animal feed and pet food
	Duration	Rs. 75 lacs
	Total amount	Prof. A.B. Pandit
	Principal Investigator	2017 – 2020
	Research Fellows	Mr. Ketan Desai
31	Sponsor	DAE-ICT Centre
	Title	Development of grafted resins and membranes (extractants) for precious metals
	Duration	3 years
	Total amount	Rs. 69 Lakh
	Principle Investigator	Prof. Anand V. Patwardhan
	Co-Investigator	Dr. Anant R. Kapdi
	Research Fellow	Swapnil Rajput
32	Sponsor	Department of Science and Technology (SERB – Green Technology)
	Title	Synthesis of novel membranes and their applications in waste minimisation and recovery of valuable chemicals from dilute aqueous streams
	Duration	3 years
	Total amount	Rs. 35 Lakh
	Principle Investigator	Prof. Anand V. Patwardhan
	Co-Investigator	Prof. Ashwin W. Patwardhan
	Research Fellow	Mr. Ketan S. Kulkarni
33	Sponsor	DAE-ICT Centre
	Title	CFD Modeling of Assymmetric Rotating Disc Contactors
	Duration	2015 – 2018

	Total amount	
	Principle Investigator	Prof. Ashwin W. Patwardhan
	Co-Investigator	
	Research Fellow	Nilesh Hendre, Raosaheb Farakte
34	Sponsor	DAE-ICT Centre
	Title	Synthesis and modification of carbon nanotubes: modeling, experimentation and application
	Duration	2015 – 2018
	Total amount	
	Principle Investigator	
	Co-Investigator	Prof. Ashwin W. Patwardhan
	Research Fellow	Anita Sharma, Mainsh Yadav, Pratiksha Biranje, Shrilekha Sawant
35	Sponsor	IGCAR
	Title	Characterization of the Regeneration Process for Liquid Sodium Cold Trap in Secondary System of Fast Breeder Reactors
	Duration	2015 – 2018
	Total amount	
	Principle Investigator	
	Co-Investigator	Prof. Ashwin W. Patwardhan
	Research Fellow	
36	Sponsor	IGCAR
	Title	Thermal Hydraulic Studies on Boiling in Long Vertical Tubes
	Duration	2015 – 2018
	Total amount	
	Principle Investigator	Prof. Ashwin W. Patwardhan
	Co-Investigator	
	Research Fellow	Dhiraj Lote, Chaitanya Mali
37	Sponsor	Department of Science & Technology (WTI Scheme), New Delhi
	Title	Treatment of Wastewater containing pesticides and emerging contaminants using novel approach of combined hydrodynamic cavitation and oxidation processes
	Duration	3 years (2016-2018)
	Total amount	54.4 Lacs
	Principal Investigator	Dr.P.R.Gogate
	Research Fellows	Pooja Thanekar
38	Sponsor	Department of Science & Technology (MOFPI Scheme), New Delhi
	Title	Intensified recovery of valuable products from whey using ultrasound
	Duration	3 years (2016-2018)

	Total amount	41.4Lacs
	Principal Investigator	Dr.P.R.Gogate
	Research Fellows	Rajeshree Khaire
39	Sponsor	DST
	Title	Treatment of ground water containing arsenic and fluoride
	Duration	
	Total amount	Rs. 17 lakh
	Principal Investigator	Mrs. K.V. Marathe
	Research Fellows	
40	Sponsor	TEQIP (CoE Process Intensification)
	Title	Sorption-enhanced reforming process for H <sub>2</sub> production
	Duration	since 2014
	Total amount	Rs. 10,00,000
	Principal Investigator	Dr. P. D. Vaidya
41	Sponsor	DAE
	Title	Conjugation and radiolabelling of various nanoplatfoms for image guided theranostic applications
	Duration	Three years (2015-2018)
	Total amount	Rs. 65,32,000
	Principal Investigator	Dr. Ratnesh Jain
	Research Fellow	Mr. Ganesh Gaikwad
42	Sponsor	DBT
	Title	NANOCOS <sup>®</sup> : -COS-siRNA nanoplexes for inhibiting intracellular mycobacteria
	Duration	Two years (2013-2016)
	Total amount	Rs. 19, 99, 000/-
	Principal Investigator	Dr. Ratnesh Jain (co-PI)
	Research Fellow	Mr. Sathish Dyawanapelly
43	Sponsor	DBT
	Title	Green process for the production and purification of low molecular weight Chitosan Oligomer using solid acid catalyst
	Duration	Three years (2016-2019)
	Total amount	Rs. 51,64, 200/-
	Principal Investigator	Dr. Ratnesh Jain
	Research Fellow	Mr. Akhil Krishnan
44	Sponsor	DAE-BRNS
	Title	Polysaccharide Based Nanocarriers for Improved Therapy of Systemic Fungal Infections
	Duration	Three years (2013-2016)

	Total amount	Rs. 16,95, 000/-
	Principal Investigator	Dr. Ratnesh Jain
	Research Fellow	Mr. Akhil Krishnan
45	Sponsor	Rajiv Gandhi Science and Technology Commission (RGSTC), Govt. of Maharashtra, 2014-2017
	Title	3D cell culture Technology for Developing Affordable Bioengineered Skin for Burn Patients
	Duration	Three years (2014-2017)
	Total amount	Rs. 85,10, 000 /-
	Principal Investigator	Dr. Ratnesh Jain (co-PI)
	Research Fellow	Mr. Rohan Chhabra
46	Sponsor	DST Nanomission 2014-2017
	Title	Development and evaluation of siRNA loaded nanomedicine in computational and cellular
	Models	
	Duration	Three years (2014-2017)
	Total amount	Rs. 2,82,00,000 /-
	Principal Investigator	Dr. Ratnesh Jain
	Research Fellow	Mr. Anurag Dobhal, Ms. Aanshu Deokuliar
47	Sponsor	DAE
	Title	Thermal hydraulic studies related to coolants for new generation reactors
	Duration	Five years
	Total amount	72,40,000/-
	Principal Investigator	Dr.C. S. Mathpati
	Research Fellows	Ms. Sona C.S.
	Mr. Bhavesh Gajbhiye	
48	Sponsor	Centre of Excellence in Process Intensification (TEQIP-II)
	Title	Design aspects of Two opposed jet microextractor: Experimental and Computational Fluid Dyanmics
	Duration	One year
	Total amount	16,00,000/-
	Principal Investigator	Dr.C. S. Mathpati
	Research Fellows	Mr. Aniket Waval
49	Sponsor	DAE- BRNS
	Title	Computational fluid dynamics and experimental study of fluidization of lithium titanate particles in fluidized and packed fluidized bed
	Duration	Three years
	Total amount	25,00,000/-



	Principal Investigator	Dr.C. S. Mathpati
	Research Fellows	Niraj Kulkarni
50	Sponsor	DAE
	Title	Development of graphene oxide based membranes for desalination
	Duration	3 years
	Total amount	
	Principal Investigator	
	Research Fellows	Jyoti Ambre
51	Sponsor	SERB
	Title	Development of ionic liquid membranes for gas separation
	Duration	3 years
	Total amount	
	Principal Investigator	
	Research Fellows	Amar Dhopte
52	Sponsor	BIRAC-BMGF
	Title	Hygienic Water Free Toilet
	Duration	1.5 years
	Total amount	
	Principal Investigator	
	Research Fellows	Shiwani Kulkarni
53	Sponsor	Department of Science and Technology, Government of India
	Title	Development of Nanocontainers for Anticorrosive Applications
	Duration	5 Years
	Total amount	35 Lacs
	Principal Investigator	Dr. D.V.Pinjari
	Research Fellows	Chandrakant Holkar, Nilesh Jadhav
54	Sponsor	Department of Science and Technology, Government of India
	Title	Development of anodic material for dye sensitized solar cell
	Duration	5 Years
	Total amount	35 Lacs
	Principal Investigator	Dr. S.M. Sontakke
	Research Fellows	Miss Tambat Sneha (PhD Student)
	Miss Umale Sanjivani (PhD Student)	
55	Sponsor	DST
	Title	J. C. Bose
	Duration	Oct-2008 to May-2017
	Total amount	Rs 1.60 crores

	Principal Investigator	Prof. J. B. Joshi
	Research Fellows	Manishkumar Yadav

## PRIVATE AGENCIES:

No.	Research Scholar	Previous Institution
1	Sponsor	Gujrat Stevia Growers and Marketing Federation
	Title	Gujrat Stevia Growers and Marketing Federation
	Duration	12 months
	Total amount	5 lakhs
	Principal Investigator	Prof. B. N. Thorat
	Research Fellows	Rahul Shete
2	Sponsor	Coromandel International Ltd.
	Title	Value addition of Crystallized Salts
	Duration	6 months
	Total amount	5.69 lakhs
	Principal Investigator	Prof. B. N. Thorat
	Research Fellows	Sachin Jadhav
3	Sponsor	Gujarat Heavy Chemicals Pvt. Ltd.
	Title	Cost effective binder similar to the present pre-gelatinized starch binder for coal briquetting
	Duration	12 months
	Total amount	17.41 lakhs
	Principal Investigator	Prof. B. N. Thorat
	Research Fellows	
4	Sponsor	Reliance Industries Ltd.
	Title	Studies on the drying and fluidization of algal slurry
	Duration	12 months
	Total amount	4.89 lakhs
	Principal Investigator	Prof. B. N. Thorat
	Research Fellows	
5	Sponsor	Marico
	Title	Rice bran oil refining
	Duration	3 years
	Total amount	
	Principal Investigator	Prof. S. S. Bhagwat
	Research Fellows	Amol Gore
6	Sponsor	Amines and plasticizers
	Title	Surface studies on lean amine solvents from gas treating units

	Duration	1.5 years
	Total amount	
	Principal Investigator	Prof. S. S. Bhagwat
	Research Fellows	
7	Sponsor	Marico
	Title	Vegetable oil properties: prediction by ANN
	Duration	6 months
	Total amount	
	Principal Investigator	Prof. S. S. Bhagwat
	Research Fellows	
8	Sponsor	HUL
	Title	Oil water interfacial tension of polymerized oil in presence of surfactant
	Duration	1 year
	Total amount	
	Principal Investigator	Prof. S. S. Bhagwat
9	Sponsor	HUL
	Title	surfactant
	Duration	2 year
	Total amount	
	Principal Investigator	Prof. S. S. Bhagwat
	Research Fellows	
10	Sponsor	GSK
	Title	Analysis of Pharmaceutical products
	Duration	3 months
	Total amount	
	Principal Investigator	Prof. S. S. Bhagwat
	Research Fellows	Swapnil Pakhale
11	Sponsor	Hindustan Unilever Ltd, Mumbai
	Title	Thermodynamics of Solubility of Tea components in water
	Duration	4 years
	Amount	Rs. 45 lakhs
	Principal Investigator	Prof. V G Gaikar
	Research Fellows	Ms. Dabir Tasneem (Ph.D. (Sci)), Mr.Syed Tanveer (Ph.D. (T))
12	Name of Project	Kinetics of Synthesis of p-Hydroxy Benzaldehyde
	Funding Agency	ATUL LTD
	Total amount	Rs. 20 lacs
	Principle Investigator	Prof. A.B. Pandit

	Year	2016-2017
	Research Scholar	Mr. Anand Jain
13	Name of Project	Recovery of Water of Esterification
	Funding Agency	Asian Paints
	Total amount	Rs. 3 lacs
	Principle Investigator	Prof. A.B. Pandit
	Year	2016-2017
	Research Scholar	Mr. Ketan Desai and Mr. Shankar Kausley
14	Name of Project	LDH Formation and Converging Diverging Cavitating Nozzles.
	Funding Agency	Hindustan Unilever Ltd., Bangalore
	Total amount	Rs. 75 lacs
	Principle Investigator	Prof. A.B. Pandit
	Year	2013 – 2018
	Research Scholar	Mr. Gaurav Dastane
15	Name of Project	Conversion of 2,6-Dichloroacetophenone to 2,6-Dichlorobenzamide
	Funding Agency	Val Organics Pvt. Ltd Mumbai
	Total amount	Rs. 5 lacs
	Principle Investigator	Prof. A.B. Pandit
	Year	2016 – 2017
	Research Scholar	Mr. Ketan Desai
16	Name of Project	Modelling of Kinetics of Tea Infusion
	Funding Agency	Unilever
	Total amount	
	Principle Investigator	Prof. A.W. Patwardhan
	Year	2016 – 2019
	Research Scholar	Geeta Yadav, Pallavee Dhekn
17	Sponsor	
	Title	Konark Industries
	Duration	3 years
	Total amount	
	Principal Investigator	Prof V.K Rathod
	Research Fellows	Sujata Patil
18	Sponsor	Mangalam Organics Ltd.
	Title	Improved processing of camphor, terpenes and resins
	Duration	3 years (2017-2019)
	Total amount	15 Lacs
	Principal Investigator	Dr.P.R.Gogate
	Research Fellows	Sinhmar Pankaj

19	Sponsor	Konark industries
	Title	Recycle and Reuse of membrane in waste water treatment
	Duration	3 years
	Total amount	
	Principal Investigator	
	Research Fellows	Hrushikesh Patil (Ph.D Tech in Chemical Engineering)
20	Sponsor	Indian Oil Corporation Ltd.
	Title	Aqueous-phase reforming of methanol and bio-oil to hydrogen
	Duration	April 2014 – March 2016
	Total amount	Rs. 80,50,000/-
	Principal Investigator	Dr. P. D. Vaidya
	Research Fellows	Mr. Santosh Jadhav
21	Sponsor	Atul Ltd.
	Title	p-Hydroxy benzaldehyde production from p-cresol -A study on reaction kinetics
	Duration	2016
	Total amount	Rs. 11,50,000/-
	Principal Investigator	Dr. P. D. Vaidya
22	Sponsor	Nanoxpert Technologies
	Title	COS as a pharmaceutical excipient
	Duration	Three years (2014-2017)
	Total amount	Rs.
	Principal Investigator	Dr. Ratnesh Jain
	Research Fellow	NA
23	Sponsor	BIRAC- Bill and Melinda Gates Foundation
	Title	Hygienic water free toilet
	Duration	3 years
	Total amount	21,22,000/-
	Principal Investigator	Dr.P. R. Nemade
	Research Fellows	-
24	Sponsor	United Phosphorous Limited
	Title	United Phosphorous Limited
	Duration	2016-2020 (4 years)
	Total amount	Rs. 26 Lakhs
	Principal Investigator	Dr. C.S. Mathpati
	Research Fellows	Prachi Dwidmuthe
25	Sponsor	Swagat Polymers, Aurangabad (India)
	Title	Development of Polymer Surfactants

	Duration	4 Years
	Total amount	20 Lacs
	Principal Investigator	Dr. D.V.Pinjari
	Research Fellows	Abhijeet Goswami
26	Sponsor	Elkay Chemicals Pvt. Ltd., Pune (India)
	Title	Development of Polymer (Silicon) Surfactants
	Duration	2 Years
	Total amount	5 Lacs
	Principal Investigator	Dr. D.V.Pinjari
	Research Fellows	Dipak Pukale
27	Sponsor	Coca Cola, Shanghai/Atlanta
	Title	Techno-feasibility of Various Dairy Products
	Duration	1 Year
	Total amount	14.1 Lacs
	Principal Investigator	Dr.D.V.Pinjari
	Research Fellows	
28	Sponsor	P&P Products, Parbhani (India)
	Title	Development of Liquid Hand Soap Formulations
	Duration	1 Year
	Total amount	2.43 Lacs
	Principal Investigator	Dr.D.V.Pinjari
	Research Fellows	
29	Sponsor	TEQIP Grant (A World bank Project Initiative)
	Title	Micro Hydro Electricity Production: Electricity Generation for Lighting and Irrigation using the natural flow of irrigation Canal and its Performance Evaluation
	Duration	1 Year
	Total amount	7.0 Lacs
	Principal Investigator	Dr.D.V.Pinjari
	Research Fellows	
30	Sponsor	Muraspec Distributors Pvt. Ltd. Mumbai (India)
	Title	Reverse Engineering of value added natural resins
	Duration	1 Year
	Total amount	11.45 Lacs
	Principal Investigator	Dr.D.V.Pinjari
	Research Fellows	
31	Sponsor	Jai Ambe Developers Mumbai (India)
	Title	Purification Techniques for raw Emerald and Blue Sapphire



	Duration	1 Year
	Total amount	2.5 Lacs
	Principal Investigator	Dr.D.V.Pinjari
	Research Fellows	
32	Sponsor	Technoforce
	Title	Technoforce
	Duration	2013-2017
	Total amount	Rs. 26 Lakhs
	Principal Investigator	Prof. J. B. Joshi
	Research Fellows	Achyut Pakhre
33	Sponsor	Technoforce
	Title	Technoforce
	Duration	2013-2017
	Total amount	Rs. 26 Lakhs
	Principal Investigator	Prof. J. B. Joshi
	Research Fellows	Ghanshyam Bhosle
34	Sponsor	United Phosphorous Limited
	Title	United Phosphorous Limited
	Duration	2016-2020 (4 years)
	Total amount	Rs. 26 Lakhs
	Principal Investigator	Prof. J. B. Joshi
	Research Fellows	PrachiDwidmuthe
35	Sponsor	PM Fellow
	Title	PM-Fellow (Company Sponsor- United Phosphorous Limited)
	Duration	4 years
	Total amount	Rs. 26 Lakhs
	Principal Investigator	Prof. J. B. Joshi
	Research Fellows	Mahesh (IIT Bombay)
36	Sponsor	GACL, Baroda
	Title	Hydroxylation of phenol.
	Duration	1 year
	Total amount	Rs 30 Lakhs + Tax
	Principal Investigator	Prof.M Lakshmi Kantam,Prof. G D Yadav and Prof. V K Rathod
	Research Fellows	3
37	Sponsor	VOL, Mumbai
	Title	Lab scale synthesis of fine and bulk chemicals
	Duration	1 Year
	Total amount	Rs. 6 Lakhs + Tax

	Principal Investigator	Prof.M Lakshmi Kantam
	Research Fellows	1
38	Sponsor	Marvel Drugs, Mumbai
	Title	Development of economical processes for Important organic Intermediates
	Duration	1 Year
	Total amount	Rs. 8 Lakhs + Tax
	Principal Investigator	Prof.M Lakshmi Kantam, Prof.V K Rathod
	Research Fellows	1
39	Sponsor	Kesar Petro products, Mumbai
	Title	Phthalonitrile
	Duration	1 Year
	Total amount	Rs. 13.6 Lakhs + Tax
	Principal Investigator	Prof. M. Lakshmi Kantam Prof.V. K. Rathod
	Research Fellows	1
40	Sponsor	L&T Hydrocarbon Engineering Ltd.
	Title	Engineering, procurement, construction, installation, commissioning & operation & maintenance service in the entire hydrocarbon chain with offerings across upstream, midstream & downstream and pipeline projects (DBT-ICT 2G Ethanol Technology)
	Duration	2017-2027
	Total amount	500.00
	Principal Investigator	
	Research Fellows	
41	Sponsor	Godrej Agrovet Ltd
	Title	Developed of improved animal feed ingredient from seed meals
	Duration	2014-2017
	Total amount	100.00
	Principal Investigator	
	Research Fellows	
42	Sponsor	InNow LLC USA
	Title	Purification of Glycerin
	Duration	2015-2016
	Total amount	25.00
	Principal Investigator	
	Research Fellows	
43	Sponsor	Bacardi & Co. Ltd
	Title	Tea Alcohol Project
	Duration	2015-2016

	Total amount	95.60
	Principal Investigator	
	Research Fellows	
44	Sponsor	Godrej Agrovet Pvt. Ltd.
	Title	Mass cultivation of algae for aqua feed
	Duration	2014-2016
	Total amount	115.00
	Principal Investigator	
	Research Fellows	

## DETAILS OF NATIONAL AND INTERNATIONAL COLLABORATIONS

- NMIMS- Nanoparticle synthesis and characterization
- COEP, Pune- Thermostable Enzymes( joint Ph.D.)
- Dr. Babasaheb Ambedkar Technological University, Lonere
- Sardar Patel College Of Engineering, Mumbai
- Shri Guru Gobind Singhji Institute of Engineering and Technology (SGGSIE&T), Nanded
- Agilent Technologies, India
- Wipro GE Healthcare Private Limited, India
- India Glycols Limited, India
- Privi Organics Private Limited, India
- Kirloskar Integrated Technologies Limited, India
- Privi Biotechnologies Private Limited, India
- Kanoria Chemicals & Industries Limited, India
- The Coca Cola Company, USA
- Atech Innovations, GmbH, Germany
- ACME Synthetic Chemicals Private Limited, Mumbai
- Camlin Fine Sciences Ltd, Mumbai.
- Godrej Agrovet Private Ltd, Mumbai
- Godrej Industries Ltd, India
- DBT-ICGEB Centre for Advanced Bioenergy Research, New Delhi, India
- CSIR-National Institute for Interdisciplinary Science & Technology, Trivandrum, India
- The Energy and Resources Institute (TERI), New Delhi
- CSIR-Central Salt & Marine Chemical Research Institute (CSIR-CSMCRI), Bhavnagar, India.
- Centre for Tropical Crops and Biocommodities, Queensland University of Technology, Brisbane, Australia
- Centre for Energy, The University of Western Australia, Perth, Australia
- Department of Chemical Engineering, Curtin University, Perth, Western Australia
- Clostridia Research Group/ Life Sciences, University of Nottingham, UK
- Institute of Biological, Environmental and Rural Sciences, Aberystwyth University, Aberystwyth, UK
- CNAB, Department of Biology, University of York, UK
- Institute for Cell and Molecular Biosciences, Newcastle University, UK
- Faculty Health & Life Sciences, Oxford Brookes

- University, UK
- Chemical Engineering Department, NIT, Warangal
- Chemical Engineering Department, AISSMS College of Engineering, Pune
- Chemical Engineering Department, LIT, Nagpur
- University of West Hungary, Hungary
- University of Minho, Portugal
- University of Sao Paulo, Brazil
- National Institute of Research in Reproductive Health, Parel, Mumbai/ Exploring biodegradable polymer combination for developing nanoparticles for delivering therapeutic nucleic acids
- Foundation of Medical Research, Mumbai, India/ NANOCOS™: -COS-siRNA nanoplexes for inhibiting intracellular mycobacteria/ Mr. Sathish Dyawanapelly
- National Burns Centre, Airoli, Navi-Mumbai/3D cell culture Technology for Developing Affordable Bioengineered Skin for Burn Patients/ Mr. Rohan Chhabra
- National Chemical Laboratory, Pune/Akhil Krishnan
- Indian Institute Technology, Bombay (IITB)/ Dr. Sameer Jadhav/ Development and evaluation of siRNA loaded nanomedicine in computational and cellular Models/ Anurag Dobhal
- Collaboration is mainly with CSIR-CSMCRI, Bhavnagar
- University of Newcastle, Australia
- Tata Institute of Fundamental Research, Mumbai
- Louisiana State University, Baton Rouge, USA
- Curtin University, Australia
- RMIT University Australia
- Dr. Himanshu Mishra, King Abdullah University of Science and Technology, Saudi Arabia. Trying to understand the effect of hydrogen bonding networks on hydrophobicity of interfaces.

## PUBLICATIONS :

No.	Title and authors		Journal	Vol. No.	Pages	Year
1	Nagwekar, N., Tidke, V., Thorat B. N.	Microbial and biochemical analysis of dried fish and comparative study using different drying methods	Drying Technology		1-11	2017
2.	Desai Shobha	Mixed Micellization of Polyoxyethylene (20) Oleyl Ether with Cetylpyridinium Chloride at the Air-Water Interface	Journal of Surfactants and Detergents	19	1169-1174	2016

3	Ahire Manisha	Novel Ester-linked Anionic Gemini Surfactant: Synthesis, Surface-Active Properties and Antimicrobial Study	Journal of Surfactants and Detergents	20	789-797	2017
4	Mali Nilesh	Mapping of optimum operating condition for LiBr-water refrigeration cycles	Sadhana	42	257-269	2017
5	Reshamwala S. M. S., Deb S. S., Lali A. M.	"A shortened, two-enzyme pathway for 2,3-butanediol production in Escherichia coli"	J Ind Microbiol Biotechnol	-	-	2017
6	Sujata Gaikwad, Reena Pandit, Arvind Lali,	"Improved lipid productivity of Chlorella Saccharophila with urea and acclimated stress under natural light for biofuels"	Journal of International Academic Research for Multidisciplinary	5 (1)	-	2017
7	Smita Patil, Reena Pandit, Arvind Lali,	"Photosynthetic acclimation of Chlorella saccharophila to heat stress"	Phycological Research	65 (2)	160-165	2017
8	Smita Patil, Reena Pandit, Arvind Lali,	"Responses of algae to high light exposure: prerequisite for species selection for outdoor cultivation"	Journal of Algal Biomass Utilization, 2017	8(1)	75-83	2017
9	Lakshmi, DS, Trivedi N and Reddy, CRK ,	"Synthesis and characterization of seaweed cellulose derived Carboxymethyl cellulose"	Carbohydrate Polymers	157	1604-1610	2017

10	Aditya Sarnaik, Reena Pandit, Arvind Lali,	“Growth engineering of Synecococcus elongates PCC 7942 for mixotrophy under natural light conditions for improved feedstock production”	Biotechnology Progress	DOI: 10.1002/btpr.2490		2017
11	Monali Kavadia, Manish Yadav, Annamma Odaneth and Arvind Lali.	“Production of Glyceryl Monostearate by Immobilized Candida Antarctica B Lipase in Organic Media”	Journal of Applied Biotechnology & Bioengineering	DOI: 10.15406/jabb.2017.02.00031		
12	Valerie Rodrigues, Onime L, Huws SA, Annamma Odaneth and Arvind Lali.	“Diversity of Ulvan and Cellulose Depolymerizing Bacteria Associated With the Green Macroalgae Ulva Spp”	Journal of Applied Biotechnology & Bioengineering	DOI: 10.15406/jabb.2017.02.00037		
13	Rutuja Vaze, Annamma Odaneth and Arvind Lali	“Controlled Protein Hydrolysis with Immobilized Alkaline Endo-Protease”	Journal of Applied Biotechnology & Bioengineering	DOI: 10.15406/ jabb.2017.02.00048		
14	Sachinkumar Birhade, Mukesh Pedneker, Shilpa Sagwal, Annamma Odaneth and Arvind Lali	“Preparation of Cellulase Concoction Employing Differential Adsorption Phenomenon”	Preparative Biochemistry & Biotechnology	DOI: 10.1080/ 10826068.2016.1275009		
15	Juliet Victoria, Annamma Odaneth and Arvind Lali,	“Influence of cellulase cocktails favouring hydrolysis of cellulose”	Preparative Biochemistry & Biotechnology	DOI: 10.1080/ 10826068.2016.1275006		
16	N Agrawal, GL Maddikeri, AB Pandit	Sustained release formulations of citronella oil nanoemulsion using cavitation techniques	Ultrasonics Sonochemistry	36	367	2017



17	Jadhav N.L., Pandit A.B., Pinjari D.V.	Green approach for the synthesis of chalcone (3-(4-fluorophenyl)-1-(4-methoxyphenyl)prop-2-en-1-one) using concentrated solar radiation	Solar Energy	147	232	2017
18	Patil B.R., Bari A.H., Pinjari D.V., Pandit A.B.	Kinetic Modelling of Hydrogenation of Cardanol over Pd/C Catalyst	Indian Chemical Engineer		1	2017
19	Bari A.H., Chawla A., Pandit A.B.	Sono-crystallization kinetics of K <sub>2</sub> SO <sub>4</sub> : Estimation of nucleation, growth, breakage and agglomeration kinetics	Ultrasonics Sonochemistry	35	196	2017
20	Shirsath S.R., Bhanvase B.A., Sonawane S.H., Gogate P.R., Pandit A.B.	A novel approach for continuous synthesis of calcium carbonate using sequential operation of two sonochemical reactors	Ultrasonics Sonochemistry	35	124	2017
21	Sreedhar B.K., Albert S.K., Pandit A.B.	Cavitation damage: Theory and measurements – A review	Wear	372-373	177	2017
22	Kausley S.B., Desai K.S., Shrivastava S., Shah P.R., Patil B.R., Pandit A.B.	Mineralization of alkyd resin wastewater: Feasibility of different advanced oxidation processes	Journal of Environmental Chemical Engineering			2017
23	Giresan S., Pandit A.B.	Modeling the effect of carbon-dioxide gas on cavitation	Ultrasonics Sonochemistry	34	721	2017
24	Amogha V., Shinde Y.H., Pandit A.B., Joshi J.B.	Image analysis based validation and kinetic parameter estimation of rice cooking	Journal of Food Process Engineering			2017

25	Shinde Y.H., Amogha V., Pandit A.B., Joshi J.B.	Kinetics of cooking of unsoaked and presoaked split peas (Cajanus cajan)	Journal of Food Process Engineering			2017
26	Sahu A., Badhe P.S., Adivarekar R., Ladole M.R., Pandit A.B.	Synthesis of glycinamides using protease immobilized magnetic nanoparticles	Biotechnology Reports	12	13	2016
27	Mawson R., Tongaonkar J., Bhagwat S.S., Pandit A.B.	Airborne Ultrasound for Enhanced Defoaming Applications	Innovative Food Processing Technologies: Extraction, Separation, Component Modification and Process Intensification		347	2017
28	Jadhav A.J., Pinjari D.V., Pandit A.B.	Surfactant assisted sonochemical synthesis of hollow structured zinc phosphate nanoparticles and their application as nanocarrier	Chemical Engineering Journal	297	116	2017
29	Bethi B., Sonawane S.H., Rohit G.S., Holkar C.R., Pinjari D.V., Bhanvase B.A., Pandit A.B.	Investigation of TiO <sub>2</sub> photocatalyst performance for decolorization in the presence of hydrodynamic cavitation as hybrid AOP	Ultrasonics Sonochemistry	28	150	2017
30	Raut-Jadhav S., Pinjari D.V., Saini D.R., Sonawane S.H., Pandit A.B.	Intensification of degradation of methomyl (carbamate group pesticide) by using the combination of ultrasonic cavitation and process intensifying additives	Ultrasonics Sonochemistry	31	135	2017

31	Raut-Jadhav S., Badve M.P., Pinjari D.V., Saini D.R., Sonawane S.H., Pandit A.B.	Treatment of the pesticide industry effluent using hydrodynamic cavitation and its combination with process intensifying additives (H <sub>2</sub> O <sub>2</sub> and ozone)	Chemical Engineering Journal	295	326	2017
32	Bhanvase B.A., Kamath S.D., Patil U.P., Patil H.A., Pandit A.B., Sonawane S.H.	Intensification of heat transfer using PANI nanoparticles and PANI-CuO nanocomposite based nanofluids	Chemical Engineering and Processing: Process Intensification	104	172	2017
33	Holkar C.R., Jadhav A.J., Bhavsar P.S., Kannan S., Pinjari D.V., Pandit A.B.	Acoustic Cavitation Assisted Alkaline Hydrolysis of Wool Based Keratins to Produce Organic Amendment Fertilizers	ACS Sustainable Chemistry and Engineering	4	2789	2017
34	Pinjari D.V., Pandit A.B., Mhaske S.T.	Ultrasound assisted green synthesis of zinc oxide nanorods at room temperature	Indian Journal of Chemical Technology	23	221	2017
35	Bhanvase B.A., Patel M.A., Sonawane S.H., Pandit A.B.	Intensification of ultrasound-assisted process for the preparation of spindle-shape sodium zinc molybdate nanoparticles	Ultrasonics Sonochemistry	28	311	2017
36	Shinde Y.H., Gudekar A.S., Chavan P.V., Pandit A.B., Joshi J.B.	Design and development of energy efficient continuous cooking system	Journal of Food Engineering	168	231	2017

37	V Prabhu, AV Patwardhan*, AW Patwardhan	Fabrication and characterization of micro-porous ceramic membrane ased on kaolin and alumina.	Indian Journal of Chemical Technology	24	367-373	2017
38	RS Zambare, KB Dhopte, AV Patwardhan, PR Nemade*	Polyamine functionalized graphene oxide polysulfone mixed matrix membranes with improved hydrophilicity and anti-fouling properties.	Desalination	403	24-35	2017
39	ND Patil, AW Patwardhan*, AV Patwardhan	Carboxylic acids separation using hollow fiber supported liquid membrane.	Indian Journal of Chemical Technology	24	20-31	2017
40	Yewale A. G., Patil N. D., Patwardhan A. W.*	Removal of Pyridine from Dilute Aqueous Streams using Hollow Fibre Supported Liquid Membranes	Desalination and Water Treatment	57 (40)	18939 – 18955	2016
41	Joshi B. S., Farakte R. A., Yadav G. U., Patwardhan A. W.*, Singh G.	Swelling kinetics of tea in hot water	J. Food Sci. Tech.	53(1)	315 – 325	2016
42	Farakte R. A., Yadav G. U., Patwardhan A. W.*, Singh G.	Role of Particle size in Tea Infusion Process	Int. J. Food. Eng.	12 (1)	1 – 16	2016
43	Sharma A.D, Patil N. D., Patwardhan A.W. *, Moorthy R. K., Ghosh P. K.	Synergistic interplay between D2EHPA and TBP towards the extraction of lithium using hollow fiber supported liquid membrane	Sep. Sci. Tech.	51 (13)	2242 – 2254	2016

44	Nirvik Sen, K.K.Singh, A.W. Patwardhan*, S. Mukhopadhyay, K.T.Shenoy, S.K.Ghosh	CFD Simulation of Two-phase Flow in Pulsed Sieve Plate Columns - Identification of a Suitable Drag Model to Predict Dispersed Phase Holdup	Sep. Sci. Tech.	51 (17)	2790 – 2803	2016
45	Nadar, S.S., Rathod, V.K.	Ultrasound assisted intensification of enzyme activity and its properties: a mini- review	World Journal of Microbiology and Biotechnology	33 (170)	1-12	2017
46	Nadar, S.S., Rathod, V.K.	Encapsulation of lipase within metal-organic framework (MOF) with enhanced activity intensified under ultrasound	Enzyme and Microbial Technology	108	11-20	2017
47	Galgali A., Gawas, S.D., Rathod, V.K.	Ultrasound assisted synthesis of citronellol laurate by using Novozym 435	Catalysis Today	In press		2017
48	Rathod, V.K.	Three phase partitioning for extraction of oil: A review, Panadare, D.	Trends in Food Science & Technology	68	145-151	2017
49	Niphadkar, S.S., Bokhale, N. B., Rathod, V.K.	Extraction of acetyl 11-keto- $\beta$ -boswellic acid (AKBA) from Boswellia serrata plant oleo gum resin using novel three phase partitioning (TPP) technique	Journal of Applied Research on Medicinal and Aromatic Plants	In press		2017
50	Jaiswal, K.S., Rathod, V.K.	Acoustic cavitation promoted lipase catalyzed synthesis of isobutyl propionate in solvent free system: Optimization and kinetic studies	Ultrasonics Sonochemistry	38	496-502	2017

51	Niphadkar, S.S., Rathod, V.K	Adsorption Kinetics, Isotherm and Thermodynamics Studies of Acetyl 11 Keto $\beta$ Boswellic Acids (AKBA) From Boswellia Serrata Extract Using Macroporous Resin	Preparative Biochemistry and Biotechnology	In press		2017
52	Panadare D.C., Rathod, V.K.	Extraction of peroxidase from bitter gourd ( <i>Momordica charantia</i> ) by three phase partitioning with dimethyl carbonate (DMC) as organic phase	Process Biochemistry	In press		2017
53	Dhage, A.B., Rathod, V.K.	Intensification of $\beta$ -glucosidase enzyme production from <i>Aspergillus niger</i> using extractive fermentation with an aqueous two-phase system				2017
54	Panadare, D.C., Rathod, V.K.	Microwave assisted enzymatic synthesis of biodiesel with waste cooking oil and dimethyl carbonate	Journal of Molecular Catalysis B: Enzymatic	In press		2017
55	Kolhe, N.S., Gupta, A.R., Rathod, V.K.	Production and purification of biodiesel produced from used frying oil using hydrodynamic cavitation	Resource-Efficient Technologies	3(2)	198-203	2017
56	SV Jadhav, P Häyrynen, KV Marathe, VK Rathod, RL Keiski, GD Yadav	Experimental and Modeling Assessment of Sulfate and Arsenic Removal from Mining Wastewater by Nanofiltration	International Journal of Chemical Reactor Engineering			2017
57	Waghmare, G.V., Chatterji, A., Rathod, V.K	Kinetics of Enzymatic Synthesis of Cinnamyl Butyrate by Immobilized Lipase	Applied Biochemistry and Biotechnology		1-15	2017



58	Tomke, P.D., Zhao, X., Chiplunkar, P.P., Xu, B., Wang, H., Silva, C., Rathod, V.K., Cavaco- Paulo, A.	Lipase-ultrasound assisted synthesis of polyesters,	Ultrasonics Sonochemistry	38	496-5502	2017
59	Gadalkar, S.M., Rathod, V.K.	Pre-Treatment of Ferulic Acid Esterases Immobilized on MNPs to Enhance the extraction of Ferulic Acid from Defatted Rice Bran in presence of Ultrasound	Biocatalysis and Agricultural Biotechnology	In press		2017
60	Dange, P.N., Rathod, V.K.	Equilibrium and thermodynamic parameters for heterogeneous esterification of butyric acid with methanol under microwave irradiation	Resource-Efficient Technologies	3(1)	64-70	2017
61	Nadar, S.S., Pawar, R.G., Rathod, V.K.	Recent Advances in Enzyme Extraction Strategies: A Comprehensive Review	International Journal of Biological Macromolecules	In press		2017
62	More, A.S., Gadalkar, S.M., Rathod, V.K.	Extraction of Rapamycin (Sirolimus) from <i>Streptomyces</i> <i>rapamycinicus</i> Using Ultrasound	Preparative Biochemistry and Biotechnology	In press		2017
63	Bansode, S.R., Rathod, V.K.	An Investigation of lipase catalysed sonochemical synthesis: A review	Ultrasonics Sonochemistry	In press		2017
64	Niphadkar, S.S., Rathod, V.K.	Extraction of Acetyl 11-keto- $\beta$ -boswellic acids (AKBA) from <i>Boswellia serrata</i> using ultrasound	Separation Science and Technology	In press		2016

65	Nadar, S.S., Rathod, V.K.	Sonochemical Effect on Activity and Conformation of Commercial Lipases	Applied Biochemistry and Biotechnology		1-19	2016
66	Kulkarni, V.M., Rathod, V.K.	Green Process for Extraction of Mangiferin from <i>Mangifera indica</i> Leaves	Journal of Biologically Active Products from Nature	6 (5-6)	406-41	2016
67	Charpe, T.W., Rathod, V.K.	KINETICS OF ULTRASOUND ASSISTED EXTRACTION OF WEDELOLACTONE FROM <i>Eclipta alba</i>	Brazilian Journal of Chemical Engineering	33 (4)	1003-1010	2016
68	Nadar, S.S., Rathod, V.K.	Facile synthesis of glucoamylase embedded metal-organic frameworks (glucoamylase-MOF) with enhanced stability	International Journal of Biological Macromolecules	95	511-519	2016
69	Khan, N. R., Jadhav, S. V., Rathod, V.K.	Enzymatic synthesis of n-butyl palmitate in a solvent-free system: RSM optimization and kinetic studies	Biocatalysis and Biotransformation	In Press		2016
70	Sojitra, U.V., Nadar, S.S., Rathod, V.K.	Immobilization of pectinase onto chitosan magnetic nanoparticles by macromolecular cross-linker	Carbohydrate Polymers	In press		2017
71	Bansode, S.R., Hardikar, M.A., Rathod, V.K.	Evaluation of reaction parameters and kinetic modelling for Novozym 435 catalysed synthesis of Isoamyl Butyrate	Journal of Chemical Technology and Biotechnology	In press		2016
72	Jadhav, S.V., Marathe, K.V., Rathod, V.K.	A pilot scale concurrent removal of fluoride, arsenic, sulfate and nitrate by using nanofiltration: Competing ion interaction and modelling approach	Journal of Water Process Engineering	13	153-167	2016

73	Ingle, P.K., Karishma, A., Rathod, V.K.	Copper removal using acid activated peanut husk from aqueous solution	Journal of Environmental Engineering and Landscape	24(3)	210-217	2016
74	Gawas, S.D., Jadhav, S.V., Rathod, V.K.	Solvent Free Lipase Catalysed Synthesis of Ethyl Laurate: Optimization and Kinetic Studies	Applied Biochemistry and Biotechnology	In press		2016
75	Nadar, S.S., Gawas, S.D., Rathod, V.K.	Self-assembled organic-inorganic hybrid glucoamylase nanoflowers with enhanced activity and stability	International Journal of Biological Macromolecules	In press		2016
76	Nadar, S.S., Rathod, V.K.	A magnetic tri-enzyme nanobiocatalyst for fruit juice clarification, Sojitra, U.V.	Food Chemistry	In press		2016
77	Gadalkar, S.M., Gogate, P.R., Rathod, V.K.	Recovery of Proteins from Rice Mill Industry Waste (Rice Bran) Using Alkaline or NaCl-Assisted Alkaline Extraction Processes	Journal of Food Process Engineering	In press		2016
78	Vetal, M.D., Rathod, V.K.	Ultrasound assisted three phase partitioning of peroxidase from waste orange peels	Green Processing and Synthesis	5(2)	205-212	2016
79	Tomke, P.D., Rathod, V.K.	Enzyme as biocatalyst for synthesis of octyl ethanoate using acoustic cavitation: Optimisation and kinetic study	Biocatalysis and Agricultural Biotechnology	7	145-153	2016
80	Rao, P.R., Rathod, V.K.	Effect of Three Phase Extraction with Ultrasound on Recovery and Antioxidant Activity of <i>Andrographis paniculata</i>	Journal of Biologically Active Products from Nature	5	264-275	2016

81	Waghmare, G.V., Rathod, V.K.	Ultrasound assisted enzyme catalyzed hydrolysis of waste cooking oil under solvent free condition	Ultrasonics Sonochemistry	32	60-67	2016
82	Zhao, X., Bansode, S.R., Ribeiro, A., Abreu A.S., Oleiveira, C., Parpot, P., Gogate, P.R., Rathod, V.K., Cavaco-Paulo, A.	Ultrasound enhances lipase-catalyzed synthesis of poly (ethylene glutarate)	Ultrasonics Sonochemistry	31	506-511	2016
83	Gadipelly, C., Rathod, V.K., Marathe, K.V.	Persulfate assisted photo-catalytic abatement of cetirizine hydrochloride from aqueous waste: Biodegradability and toxicity analysis	Journal of Molecular Catalysis A: Chemical	414	116-121	2016
84	Kulkarni, V.M., Rathod, V.K.	Utilization of waste dried Mangifera indica leaves for extraction of mangiferin by conventional batch extraction and advance three phase partitioning	Green Processing and Synthesis	5 (1)	79-85	2016
85	Nadar, S.S., Rathod, V.K.	Magnetic macromolecular cross linked enzyme aggregates (CLEAs) of glucoamylase	Enzyme and Microbial Technology	83	78-87	2016
86	N. R. Sikwal, S. H. Sonawane, B. A. Bhanvase, K. Ramisetty, D. V. Pinjari, P. R. Gogate, R. S. Babu.	Ultrasound assisted preparation of ZnO nanostructures: Understanding the effect of operating Parameters,	Green Processing & Synthesis	5(2)	163-172	2016

87	A. J. Barik, S. Kulkarni, P. R. Gogate.	Degradation of 4-chloro 2-aminophenol using combined approaches based on microwave and photocatalysis,	Separation & Purification Technology	168	152- 60	2016
88	P.R. Gogate, P.N. Patil.	Discussion on Sonochemical reactors,	Topics in Current Chemistry	374 (5)	1-27	2016
89	L.P. Ramteke, P.R. Gogate	Removal of copper and hexavalent chromium using immobilized adsorbent,	Clean-Air, Water and Soil	44 (8)	1051-65	2016
90	N.B. Bhaskar, A.D. Kadam, J.J. Biwal, P.M. Diwate, R. R. Dalbhanjan, D.D. Mahale, S.P. Hinge, B.S. Banerjee, A.V. Mohod, P. R. Gogate.	Removal of Rhodamine 6G from Wastewater Using Solar Irradiations in the Presence of different additives,	Desalination & Water Treatment	57 (39)	18275-18285	2016
91	R. R. Dalbhanjan, N. S. Pande, B.S. Banerjee, S.P. Hinge, A.V. Mohod, P. R. Gogate.	Degradation of Patent Blue V Dye Using Modified Photocatalytic Reactor based on solar and UV irradiations,	Desalination & Water Treatment	57 (39)	18217-18228	2016
92	S. P. Hinge, M. S. Orpe, K. V. Sathe, G. D. Tikhe, N. S. Pandey, K. N. Bawankar, M. V. Bagal, A. V. Mohod, P. R. Gogate.	Combined removal of Rhodamine B and Rhodamine 6G from wastewater Using novel Treatment approaches based on ultrasonic and ultraviolet irradiations	Desalination & Water Treatment	57	23927-23939	2016

93	L.P. Ramteke, P.R. Gogate.	Improved treatment approach for the removal of aromatic compounds using polymeric beads in Fenton pretreatment and biological oxidation,	Environmental Science & Pollution Research	23 (20)	20281-20296	2016
94	S.. R. Iyer, P. R. Gogate	Ultrasound Assisted Crystallization of Mefenamic Acid: Effect of operating parameters and comparison with conventional approach,	Ultrasonics Sonochemistry	34	896-903	2017
95	H.V. Khare, P.R. Gogate.	Intensification of catalytic wet air oxidation for industrial effluent treatment using ozone and ultrasound as pretreatment,	Desalination & Water Treatment	58	63-71	2017
96	S. R. Shirsath, B. A. Bhanvase, S. H. Sonawane, P.R.	A novel approach for continuous synthesis of calcium carbonate using sequential operation of two sonochemical reactors, Gogate, A.B. Pandit.	Ultrasonics Sonochemistry	35 (A)	124-133	2017
97	S. Shabana, S. H. Sonawane, V. Ranganathan, P. H. Pujjalwar, D. V. Pinjari, B. A. Bhanvase, P.R. Gogate, M. Ashokkumar.	Improved synthesis of aluminium nanoparticles using ultrasound assisted approach and subsequent dispersion studies in di-octyl adipate,	Ultrasonics Sonochemistry	36	59-69	2017
98	S. B. More, P. R. Gogate, J. S. Waghmare,	Ultrasound pretreatment as a novel approach for intensification of lipase catalyzed esterification of tricaprylin,	Ultrasonics Sonochemistry,	36	253-261	2017

99	A.V. Mohod, A.S. Subudhi, P.R. Gogate.	Intensification of esterification of non edible oil as sustainable feedstock using cavitation reactors,	Ultrasonics Sonochemistry	36	309-318	2017
100	A. J. Barik, P. R. Gogate	Degradation of 2,4-dichlorophenol using combined approach based on ultrasound, ozone and catalyst,	Ultrasonics Sonochemistry	36	517-526	2017
101	S.V. Sancheti, P.R. Gogate	A review of engineering aspects of intensification of chemical synthesis using ultrasound,	Ultrasonics Sonochemistry	36	527-543	2017
102	C.N. Gajendragadkar, P. R. Gogate.	Ultrasound Assisted Acid Catalysed Lactose Hydrolysis: Understanding into effect of operating parameters and scale up studies,	Ultrasonics Sonochemistry	37	9-15	2017
103	S.N. Jain, P.R. Gogate.	NaOH treated dead leaves of Ficus racemosa as an efficient biosorbent for Acid Blue 25 dye removal,	International Journal of Environmental Science and Technology	14 (3)	531-42	2017
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## PATENTS :

No.	Inventors	Title	Country	Funding agency
1	Thorat B. N. and Chokashi K. P	Haemostatic BioSponge	India	RGCST
2	Thorat B.N., Tidke V.B. and Kokate S.R.	Solar Dryer with control Radiation	India	RGCST
3	Thorat B.N., Tidke V.B. and Kokate S.R.	Turmeric Processing	India	Bill Gates
4	Thorat B.N., Tidke V.B. and Kokate S.R.	Solar Dryer with control Radiation	PCT/International	Bill Gates
5	Kalpana Mahalle, Pallavi Parab, Prof. S.S. Bhagwat (Application no.201621034194)	Energy and exergy efficient refrigeration system and method of using it	India	COEPI
6	Manisha Ahire, Prof. S.S. Bhagwat (Application no. IP 201721003854 dt. 2/2/17)	Ester-linked Gemini surfactant and process of synthesis thereof	India	VVF
7	Anant Ghumare, Prof. S.S. Bhagwat (Application no. 269441)	Novel amido amine based compounds useful as surfactants	India	
8	Lali Arvind Mallinath; Odaneth Annamma Anil; Vadgama Rajesh; Warke Mrunal; Bhat Anuradha	Enzymatic process for fat and oil hydrolysis	Patent No.: AU2013213921, Issued notice of acceptance, 2017	
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9	Lali Arvind Mallinath, Nagwekar Pooja Devidas, Varavadekar Jayesh Suman, Wadekar Prathamesh Chandrashekher, Gujarathi Swapnali.	Method for production of fermentable sugars form biomass	Philippines Patent Application no. 1-2011-502465/31st March 2016-09-30	
10	Deb Shalini Subir; Reshamwala Shamlan Mohammed Shafi; Lali Arvind Mallinath	Ammonia assimilation by recombinant microorganism	Indian Application No: 201721023070	

11	Lali Arvind Mallinath; Odaneth Annamma Anil; Pawar Pratik Prashant; Warke Mrunal Anil; Vadgama Rajeshkumar Natwarlal; Chourasia, Vallari Ramesh	Extractive production of microbial oil using oleaginous yeasts	Indian Application No: 201721013545
12	Lali Arvind Mallinath; Pandit Reena; Sarnaik Aditya; Rai Peeyush Shekhar	Genetically modified microorganism and process for production of zeaxanthin therefrom	Indian Application No: 201721011982
13	Lali Arvind Mallinath; Pawar Hitesh Suresh	Process for treating liquid industrial effluents to produce clean water and recovering pollutants for value addition	Indian Application Number: 201721002215
14	Kale Sandeep Bhaskar; Lali Arvind Mallinath; Patel Bhavin Manubhai Jha Pamela; Gupta Vinod; Kohli Ashwani Kumar; Mital Vineet	Process for purification and refining of glycerol	Indian Application No.: 201621000574 PCT Application No.: PCT/ IN2017/050013
15	Lali Arvind Mallinath; Sharma Manju; Pawar Hitesh Suresh; Gore Suhas	A process for generation of biogas from organic matter via its liquefaction to biocrude	Indian Application Number: 201621030327
16	Lali Arvind Mallinath; Odaneth Annamma Anil; Victoria Juliet Joanna; Choudhari Vikram Gunvant; Mahadik Chinmayee Ramray; Sawant Sneha Chandrakant; Khairat Mayur Basavraj; Birhade Sachinkumar HIRAMAN	Enzymatic hydrolysis process for production of fermentable sugars	Indian Application Number: 201621030093
17	Lali Arvind Mallinath; Pawar Hitesh Suresh; Shravan sreenivasan.	A catalytic liquefaction (CTL) method for production of bio-crude oil using ionic liquid catalyst and preparation thereof	Indian Application Number: 201621025317 PCT Application No.: PCT/ IN2017/050303

18	Lali Arvind Mallinath; Chandrayan Sanjeev Kumar, Sathe Sneha, Soni Suarabhi.	A novel glucose tolerant glucosidase enzyme (Mbgl)	Indian Application Number: 201621022859
19	N. L. Jadhav, S. E. Karekar, A. J. Jadhav, C. R. Holkar, D. V. Pinjari, A. B. Pandit	Solar Assisted Method for Preparation of Chalcone Compound	Indian Patent Application No. 25462/MUM/2016
20	PK Ghosh, SS Bhagwat, AV Patwardhan, AW Patwardhan, PG Suryawanshi, V Prabhu, AR Iyer, EP Godbole	“Process for lowering fresh water and fresh detergent consumption in household laundry washing machine application”	Indian Patent applied in March 2017
21	Gore Manish Ravikiran, Dandekar Jain Prajakta, Jain Ratnesh	Microfluidic device for the development of in-vitro co- cultures of mammalian tissues	India
22	Gore Manish Ravikiran, Dandekar Jain Prajakta, Jain Ratnesh	Microfluidic mammalian co- culture device	India
23	Prajakta Dandekar, Ratnesh Jain, Vijay Yadav, Nikhil Kalane, Rohan Chhabra, Anomitra Dey, Tejal Pant	Kit for pyrogen detection and depyrogenati-on of water	India
24	Prajakta Dandekar, Ratnesh Jain, Vijay Yadav	Methods for preparation of water-soluble and water- insoluble derivatives of saccharides and alkali, alkaline earth, transition and nobel metals	India
25	Pofali Prasad Ashok, Jain Ratnesh Dharamchandra, Dandekar Jain Prajakta, Pattani Aditya Sunil	Method of manufacturing concentrated silver nanopowder	India
26	Prajakta Dandekar, Ratnesh Jain and Vandana Patravale	Indian Trademark entitled ‘NANOTARG’	India
27	Ratnesh Jain, Prajakta Dandekar and Vandana Patravale	Polymeric Nanoparticles of Curcumin for Improved Delivery	India

28	P. Maiti, P. K. Ghosh et al.	Selective extraction of potassium chloride from schoenite end liquor employing tartaric acid as safe, benign and recyclable extractant	U. S. 9,540,248	CSIR
29	P. K. Ghosh et al.	Process for improved seaweed biomass conversion for fuel intermediates, agricultural nutrients and fresh water	U. S. 9,452,993	CSIR
30	P. K. Ghosh et al.	Desalination unit for the production of potable water from subsoil brine	U. S. 9,227,853	CSIR
31	P. K. Ghosh et al.	Method of recycling of by-products for the production of soda ash and ammonium sulphate	U. S. 9,193,601	CSIR
32	S. T. Rajan, P. K. Ghosh et al.	Manually operated continuous flow type drinking water disinfectant using concentrated solar radiation	U. S. 9,156,713	CSIR
33	P. K. Ghosh et al.	Production of high purity salt with reduced levels of impurities,	U. S. 9,090,478	CSIR
34	K. H. Mody, P. K. Ghosh et al.	A process for integrated production of ethanol and seaweed sap from <i>Kappaphycus alvarezii</i>	U. S. 8,969,056	CSIR

## BOOK CHAPTER :

No.	Author(s)	Title of the chapter	Editor	Publisher	Place	Year	Page
1	Dr. Jitendra Govind Tongaonkar, Prof. A.B.Pandit, Prof.Sunil S. Bhagwat, R. Mawson	Airborne Ultrasound for Enhanced Defoaming Applications	Kai Knoerzer, Pablo Juliano, Geoffrey Smithers	CRC Press	Florida	2017	pg 347 - 359



2	S. E. Karekar , A. J. Jadhav ,C. R. Holkar , N. L. Jadhav , D. V. Pinjari , A. B. Pandit, B.A. Bhanvase, S. H. Sonawane	Ultrasonically created rectangular shaped zinc phosphate nanopigment: Synthesis, Characterization and its anticorrosive performance, Chapter in “Process Modeling, Simulation, and Environmental Applications in Chemical Engineering”	B A Bhanvase & R P Ugwekar	CRC Press, a Taylor & Francis Group, USA		2016	In press
3	Prof. V.K. Rathod Priyanka Rao	Phytochemicals:An insight to modern extraction technologies and their applications	Alexdanru Mihai	Academic Press	Romania	2017	
4	Nishat Khan	Application of enzyme catalysed reactions in cosmetics	Alexdanru Mihai	Academic Press	Romania	2017	
5	J. K. Kumar, P. R. Gogate, A. B. Pandit	Treatment of Industrial and Municipal Wastewater: An Overview about Basic and Advanced Concepts, Book chapter in Applied Bioengineering: Innovations and Future Directions	Toshiomi Yoshida		Wiley	2017	469- 520

6	S.M. Joshi, P.R. Gogate	Intensified Synthesis of Bioethanol from Sustainable Biomass, Book chapter in L. Singh, V.C. Kalia (eds.), Waste Biomass Management – A Holistic Approach	Lakhveer Singh, Vipin Chandra Kalia		Springer International Publishing AG	2017	251-287
7	P.B. Subhedar, P.R. Gogate	Intensified Synthesis of Biodiesel from Sustainable Raw Materials Using Enzymatic Approach, Book chapter in L. Singh, V.C. Kalia (eds.), Waste Biomass Management – A Holistic Approach	Lakhveer Singh, Vipin Chandra Kalia		Springer International Publishing AG	2017	311-338
8	Dipak K. Chandre, Chandrakant R. Holkar, Ananda J. Jadhav, Dipak V. Pinjari	Hydrodynamic Cavitation for Distillery Waste Water Treatment- A Review		CRC press Taylor & Francis group	USA	2016	
9	S. E. Karekar , A. J. Jadhav ,C. R. Holkar , N. L. Jadhav , D. V. Pinjari , A. B. Pandit, B.A. Bhanvase, S. H. Sonawane	Ultrasonically created rectangular shaped zinc phosphate nanopigment: Synthesis, Characterization and its anticorrosive performance	Prof. B. A. Bhanvase & Prof. R. P. Ugwekar	CRC press Taylor & Francis group	USA	2016	

10	M. Lakshmi Kantam*, R. Kishore , J. Yadav, S.K. Bhargava, L.A. Jones, A. Venugopal	Chapter 00010: Hydrogenation for Fine Chemical Synthesis: Status and Future Perspectives	Sunil S. Joshi and Vivek V. Ranade	Elsevier	Netherlands	2016	427-462
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## MEMBERSHIP OF IN-HOUSE COMMITTEES

### PROF. B.N. THORAT

- Head, Department of Chemical Engineering

### PROF. S. S. BHAGWAT

- Coordinator - Center of excellence – Process Intensification
- Vice-president – Technological Association
- Co-ordinator, Post Graduate Diploma in Chemical Technology Management Course
- Dean council PGPC/UGPC
- Academic council As VP-TA:
- Student welfare and mentorship Cultural and co-curricular activity Sports
- Bombay technologist and Spirit Election Media publicity

### PROF. V. G. GAIKAR

- ICT-DAE Centre for Chemical Engineering Education and Research
- Planning and Monitoring Board.

### PROF. A. M. LALI

- Head, DBT-ICT Centre for Energy Biosciences

- Chairman, TEQIP Industry Institute Interaction Cell
- Chairperson : Research Recognition Committee (Bioprocess Technology)
- Chairperson: Research Recognition Committee (Biological Sciences)

### PROF. A. B. PANDIT

- Dean, Research Consultancy and Resource Mobilisation
- Co-ordinator, ICT-DAE Centre

### PROF. A.V. PATWARDHAN

- Planning and Monitoring (member)
- Outreach activity / social responsibility (Co-chair)
- Material Procurement (member)
- Examination (member)
- Unfair means in examinations and Vigilance squad (member)
- Placement 'faculty in-Charge' for Chemical Engineering Department since August 2012

### PROF. A. W. PATWARDHAN

- Member U.G./P.G. Admissions committee
- Member Green ICT committee
- Co-coordinator Innovation Networking Centre, TEQIP
- Member Internal Quality Assurance Cell

### PROF. V. K. RATHOD

- ICT Placement Incharge

### DR. P. R. GOGATE

- In-charge, Information Processing Center
- Member, Website Committee and Computerization committee

### DR. P. D. VAIDYA

- Warden, Hostel 1
- Deputy Coordinator, M. Tech. (Green Tech)
- Coordinator, Safety Certificate Course
- Incharge, Common Instrumentation Lab, CE Dept.

### DR. R. D. JAIN

- FIST Committee, Department of Chemical Engineering
- Member of committee to revamp the Institute website

### DR. C. S. MATHPATI

- Admission Committee
- Sr. Supervisor, Examination Committee

### DR. S. M. SONTAKKE

- Co-ordinator for Industrial visits

### DR. J. S. SONTAKKE

- Warden, Hostel no. 3, Timetable Committee

### PROF. P. K. GHOSH

- Coordinator – TEQIP Innovation Network

- Coordinator – S. M. Mokashi Endowment for Incubation

### PROF. L. K. MANNEPALLI

- Member, Green Technology and Nanotechnology

## SEMINARS/ LECTURES/ CONFERENCES/ SYMPOSIA/ WORKSHOPS/ SUMMER OR WINTER TRAINING SCHOOLS ATTENDED/ORAL OR POSTER PRESENTATIONS

### PROFESSOR B.N. THORAT

- N Nagwekar, O Apine, V Tidke, J Jadhav, **B. N. Thorat** (2016) RP-HPLC-QTOF/MS2 Based Strategy for the Comprehensive Metabolite Profiling of Bombay Duck (*Harpadon nehereus*) Dried by Using Different Techniques. **Oral Presentation** at 20th International Drying Symposium (IDS 2016), Gifu, Japan, August 7-10.
- P M Koshy , V Ghate , **B. N. Thorat** (2016) Effect of 410 NM Light Emitting Diodes on the Native Microfrora and Dehydration of Selected Fresh Produce. **Oral Presentation** at 20th International Drying Symposium (IDS 2016), Gifu, Japan, August 7-10.
- R Hangekar , V Ghate , V Tidke , **B. N. Thorat** (2016) Comparison of the Dehydration and Rehydration of Paneer (Indian Cottage Cheese) by Hot Air and Microwave Drying. **Poster Presentation** at 20th International Drying

Symposium (IDS 2016), Gifu, Japan, August 7-10.

- Jadhav S., Haramkar S., Kamble A., **Thorat B. N.** (2016) Insights into dewatering and characterization of waste activated sludge from Indian perspective. **Oral and poster Presentation** at Filtech 2016, Cologne, Germany, October 11-13.

### PROFESSOR A.M. LALI

- **Participate** in The Clean Energy Ministerial 8 (CEM8) & Second Mission Innovation (MI2) Summit at Beijing, China on 6th – 8th June 2017.
- **Participate** in Rice Research Summit: What can we learn from each other? Organized by University of York, UK on 23rd -24th February 2017.
- Attended SAFEHERB **workshop** on “The Sustainable production of environmentally-friendly herbicides” at ICGEB, New Delhi on 6th -8th February 2017.

- Invited has an Advisory Committee Member and deliver talk for **International Conference** on Bioenergy at Modern College, Pune on 3rd -4th February 2017.
- Attended **seminar** on “Biological Conversion of Hydrocarbon to Methane” at ONGC Energy Centre, New Delhi on 2nd December 2016.
- Attended **workshop** on “Biomass Supply Chain” at ICRISAT organized by Ministry of Petroleum & Natural Gas, Department of Bio Technology & ICRISAT, Hyderabad on 15th-16th November 2016.
- Attended on “Creating Investment Avenues on setting up of Second Generation (2G) Ethanol project by Oil PSUs” on 3rd November 2016.
- Awarded The Science & Technology “Eminent Scientist” Award by KG Foundation, Coimbatore on 13th October 2016.
- Attended one day UK India

**workshop** on Industrial Biotechnology in Mumbai on 12th September 2016 organized by UK Science and Innovation Network (S&IN), India.

- **Participate** in World Biofuel Day celebration conference at Vigyan Bhawan, New Delhi on 10th August 2016.

### PROF. A.B. PANDIT

- The word academy of science (TWAS), General Meeting in Rwanda, South Africa, 2016
- 15th Meeting of the European Society of Sonochemistry-ESS15 in Istanbul, Turkey, 2016

### PROF. A.V. PATWARDHAN

- **“Transport of Ruthenium through Supported Liquid Membrane”** (Abstract No. 2017 / 2041), Swapnil R. Chaudhari, P Lakshmi Narayan Patro, Anand V. Patwardhan. **Paper presented** at International Conference on Membrane Technology and its Applications (MEMSEP 2017), organised by National Institute of Technology, Tiruchirappalli. 21-23 February 2017.
- **“Introduction to Research Approach”**. **Invited lecture** at 4th INSPIRE Science Camp of DST (“Innovation in Science Pursuit for Inspired Research”. 06 to 10 December 2016), organised by G. N. Sapkal College of Engineering, Nashik. The audience of about 160

students of 11th Grade (Science).

- **Attended workshop on “Orientation to Chemical Security Risk Management”**, at ICT, Mumbai, organised by ICT Mumbai. Sponsored by The United States Department of State. October 5 to 7, 2016.
- **Attended one-day seminar on “Materials Characterization”**, at HBNI Complex, BARC, Mumbai, organised by Society of Industrial Chemistry and Chemistry Division, BARC. 2 July 2016.
- **Attended one-day seminar on “Effluent Treatment and Processing”**, at ICT Mumbai, organised by Department of Dyestuff Technology, ICT Mumbai. 14 Sept 2016.
- **Attended one-day seminar on “Water: Conservation, Recycling and Desalination”**, at ICT Mumbai, organised by IICHe – Mumbai Regional Centre in association with Indian Desalination Association. 4 Feb 2017.
- **Attended five-day short term course on “Advanced Treatment and Recycling of Urban and Industrial Wastewater”**, at IIT Kharagpur, organised by School of Water resources, IIT Kharagpur, and TEQIP Phase II. 6 to 10 March 2017.
- **“Microbial colorants/pigments”**, Vaishali

M. Kulkarni, Arjun Singh Bajwa, Anand V. Patwardhan. **Business proposal presented** at AXISMOVES-2017. Secured first position in Technology Business and was awarded a winner’s trophy and a cash prize of Rs. 25 Lakhs. Organised by Axis Bank, at New Delhi, 2017. Vaishali and Arjun were felicitated by UAA (UDCT Alumini association) in 12 May 2017 for this achievement.

- **“Microbial colorants/pigments”**, Vaishali M. Kulkarni, Arjun Singh Bajwa, Anand V. Patwardhan. **Business proposal presented** at IIGP-FICCI DST-LOCKHEED Programme. Gold Medal and awarded cash prize of Rs. 1 Lakh. IIGP (India Innovation Growth Programme) is a joint initiative of Department of Science and Technology (GOI); Lockheed Martin Corporation; Indo-US Science and Technology Forum; Federation of Indian Chambers of Commerce and Industry (FICCI); Stanford Graduate School of Business and the IC2 Institute at the University of Texas. Website-<http://www.indiainnovates.in/>. New Delhi, 2017.

### PROF. A. W. PATWARDHAN

- CFD Modeling of High Pressure Subcooled Boiling Flow in Vertical Tubes

Course on “Application of Numerical Heat Transfer to Industrial Problems”, Organized by Indian Nuclear Society, BARC, May 8 – 12, 2017

## DR. P. R. GOGATE

### Details of invited lectures (International)

- P.R. Gogate, “Process Intensification using Cavitation Reactors and enzymes” Invited lecture at University of Minho, Portugal, November 2016
- P.R. Gogate, “Intensification of Chemical processing applications using Cavitation Reactors” Invited lecture at Faculty of Engineering, University of Porto, Portugal, November 2016

### Details of invited lectures (National)

- P.R. Gogate, “Intensification of Chemical processing applications using Cavitation Reactors” Invited lecture at National workshop on Advances in Chemical Reactor Design, AISSMS College of Engineering, February 2017
- P.R. Gogate, “Improved crystallization using ultrasonic irradiation” Invited lecture at WFCFD workshop, ICT Mumbai, March 2017
- P.R. Gogate, “Improvements in wastewater treatment based on oxidation processes” Invited lecture at Indo-German conference on water management in India,

Hotel Sheraton, Pune, May 2017

- P.R. Gogate, “Chemical Reaction Engineering”, Invited Faculty in Refresher course on Chemical Engineering organized by Indian Chemical Council, Mumbai, Maharashtra, June 2017
- P.R. Gogate, “Improved wastewater treatment using advanced oxidation processes” Invited lecture at Seminar on Solution based awareness on air and water quality for MIDC, Tarapur MIDC, June 2017

## MRS. K.V. MARATHE

- Exergy analysis of Micellar Enhanced UltraFiltration, SESTEC-2014
- Modelling and Simulation of MEUF, SESTEC-2014

## DR. P. D. VAIDYA

- 5th International Conference of Hydrogen and Fuel Cells, Dec. 11-13, 2016, Hyderabad
- PETROTECH 2016, New Delhi, December 6-8, 2016.
- “How to overcome challenges in hydrogen production from steam reforming of biomass surrogates” Sustainable Development for Energy and Environment
- (ICSDEE-2017) at NCL, Pune.

## DR. R.D. JAIN

- Hands on Training Workshop on Nano Drug

Delivery System : Synthesis, Characterisation and Cellular Imaging, ICT, Mumbai, India, October 2015 [Organizer and Convener]

- 15<sup>th</sup> International Symposium of the Controlled Release Society-Indian Chapter, at the Institute of Chemical Technology, Mumbai, India, February 2016

## DR. C.S. MATHPATI

- 6th International and 43rd National Conference on Fluid Mechanics and Fluid Power, 17-17 December 2016, Dept. of Applied Mechanics, MNNIT Allahabad. Sandeep N. Gosavi, Niraj Kulkarni, C. S. Mathpati, D. Mandal Computational Fluid Dynamics Of Heat transfer in Packed And Fluidized Bed Systems
- Application of Computational Fluid Dynamics, VJTI, Matunga, Mumabai 400 019, C. S. Mathpati, Computational Fluid Dynamics and its application

## DR. D.V. PINJARI

- A. J. Jadhav, D. V. Pinjari, A. B. Pandit, Cavitation Induced Physico-chemical Transformation for Synthesising Materials at Nano-Scale, in Outstanding Young Chemical Engineers (OYCE) Competition-2015, organized by Indian Institute of Chemical Engineers - Mumbai



- Regional Centre (**IICHe-MRC**), during 13th -14th March 2015.
- A. J. Jadhav, S. E. Karekar, C. R. Holkar, N. L. Jadhav, **D. V. Pinjari**, A. B. Pandit, Cavitation: a Novel Approach for Process Intensification, in **National Conference On Recent Trends In Chemical Engineering And Technology (REACT) 2015**, organized by Laxminarayan Institute Of Technology (LIT), Nagpur, during 27th-28th February 2015.
  - S. E. Karekar, A. J. Jadhav, C. R. Holkar, N. L. Jadhav, **D. V. Pinjari**, A. B. Pandit, Synthesis of Molybdenum disulphide by using ultrasound and conventional method: Comparison of effect of Calcination temperature on crystal structure of Molybdenum disulphide synthesized by using both methods, in **National Conference On Recent Trends In Chemical Engineering And Technology (REACT) 2015**, organized by Laxminarayan Institute Of Technology (LIT), Nagpur, during 27th-28th February 2015.
  - N. L. Jadhav, S. E. Karekar, C. R. Holkar, A. J. Jadhav, **D. V. Pinjari**, A. B. Pandit, Solar Assisted Intensification of Chalcone (3-(4-fluorophenyl)-1-(4-methoxyphenyl) prop-2-en-1-one): Advantage over conventional route, in National Level **Seminar** on Recent Trends In Nanomaterial And Their Applications (RTNA) 2015 organized by Department of Physics and Chemistry, Sangola College, Sangola, during 23th-24th January 2015.
  - A. J. Jadhav, C.R. Holkar, N. L. Jadhav, A. B. Pandit, **D. V. Pinjari**, Acoustic Cavitation as a Novel Approach for Formulation of Paraffin Wax Nanoemulsions, in NANO INDIA 2015, organized by the Centre for Nanotechnology & Advanced Biomaterials (CeNTAB), SASTRA University, Thanjavur, during 29th-30th January 2015.
  - S. E. Karekar, A. J. Jadhav, D. K. Chandre, A. B. Pandit, and **D. V. Pinjari**, Doping of N-OctylPhosphonic acid species on the surface of ultrasonically synthesized Zinc phosphate nanopigment and its anticorrosive performance in carrier resin at various concentrations, in **NANO INDIA 2015**, organized by the Centre for Nanotechnology & Advanced Biomaterials (CeNTAB), SASTRA University, Thanjavur, during 29th-30th January 2015.
  - R. Holkar, A. J. Jadhav A. B. Pandit, **D. V. Pinjari**, Bacterial decolourisation of Reactive Blue 19 using an isolated strain of Enterobactersp.F NCIM 5545, in Trombay **Symposium** on Desalination and Water Reuse 2015, organized by Board of Research in Nuclear Science (BRNS) Indian Desalination Association (InDA), during 22th-23th January, 2015.
  - C. R. Holkar, A. J. Jadhav, S. E. Karekar, **D. V. Pinjari**, A. B. Pandit, Biodegradation of Reactive Blue 19 using an isolated strain of Enterobactersp.F **NCIM 5545**. In 67th Annual Session of Indian Institute of Chemical Engineers, **CHEMCON 2014**, organized by Chandigarh Regional Centre, Indian Institute of Chemical Engineers, during 27th-30th December, 2014.
  - **S. E. Karekar**, A. J. Jadhav, A. B. Pandit, and D. V. Pinjari, Poster presented on “A study of sonochemical synthesis of Zinc Phosphate and its anticorrosive performance in carrier resin such as epoxy at its various concentrations” in 11th **international symposium** on Surface Protective Coatings and Paint Expo 2014, organized by The Society for Surface Protective Coatings, India during 19-21st January 2014.
  - **A. J. Jadhav**, S. E. Karekar, A. B. Pandit, and D. V. Pinjari, Paper presented on “Ultrasound assisted synthesis of core and shell assembly of Zinc phosphate



- based nanocontainers and its study of release of inhibitor at varying pH” in 11th international **symposium** on Surface Protective Coatings and Paint Expo 2014, organized by The Society for Surface Protective Coatings, India during 19-21st January 2014.
- **D. V. Pinjari**, B. A. Bhanvase, S. H. Sonawane and A. B. Pandit, Paper presented on “Ultrasound Assisted Synthesis of Poly (Methyl Methacrylate-co- Styrene) by Emulsion Copolymerization” in **NanoCon** 2010, organized by BVU Pune, India during 14-15th October 2010
  - **D. V. Pinjari** and A. B. Pandit, **Work presented** on “Synthesis of Nanomaterials: Cavitation Technological Approach” in 6th Outstanding Young Chemical Engineering Award (OYCE) 2010, organized by Indian Institute of Chemical Engineers Mumbai Regional Chapter (IICChE MRC) and M.G.M. College of Engineering Mumbai (India) during 27th March 2010.
  - **D. V. Pinjari**, V. S. Karande, S. T. Mhaske and A. B. Pandit, **Paper presented** on “Ultrasonic Assisted Synthesis of PS/TiO<sub>2</sub> Nanoemulsions” in International Conference on Advancements in Polymeric Materials (APM-2010), organized by CIPET
  - Bhubaneswar (India) during 20 -22nd February 2010.
  - Krishnamurthy Prasad, **D. V. Pinjari**, A. B. Pandit and S. T. Mhaske, Paper **presented** on “Ultrasound Assisted Synthesis of PMMA/ CaCO<sub>3</sub> Nanoemulsions” in International Conference on Advancements in Polymeric Materials (APM-2010), organized by CIPET Bhubaneswar (India) during 20 -22nd February 2010.
  - V. S. Karande, **D. V. Pinjari**, Parag Wasekar, A. B. Pandit and S. T. Mhaske, Paper **presented** on “Ultrasonic Assisted Synthesis Of Polystyrene Nanoemulsions” in International Conference on Advancements in Polymeric Materials (APM-2010), organized by CIPET Bhubaneswar (India) during 20 -22nd February 2010.
  - Krishnamurthy Prasad, **D. V. Pinjari**, A. B. Pandit and S. T. Mhaske, **Paper presented** on “Synthesis Of Nanostructured Metal Oxide (TiO<sub>2</sub>) by Acoustic Cavitation Assisted Sol-Gel Technique”, in International Conference on Nano Science and Technology (ICONSAT-2010), organized by Indian Institute of Technology Bombay Mumbai, India during 17 – 20th February 2010.
  - **D. V. Pinjari** and A. B. Pandit, **Paper presented** on “Cavitation Based Fabrication of Micron Size Soft Rubbery and Rigid Material into Nanomaterials” in National Conference on “Nanomaterials and Nanotechnology” (NCNN 2010), organized by Department of Chemistry and Department of Chemical Engineering, VNIT Nagpur (India) during 18th – 20th January 2010.
  - **D. V. Pinjari**, N. R. Savadekar, S. T. Mhaske and A. B. Pandit, **Paper presented** on “Ultrasonic Assisted Synthesis of Nano Metal Oxide” in National Conference on “Nanomaterials and Nanotechnology” (NCNN 2010), organized by Department of Chemistry and Department of Chemical Engineering, VNIT Nagpur (India) during 18th – 20th January 2010.
  - **D. V. Pinjari** and A. B. Pandit, Paper presented on “Ultrasonic Assisted Synthesis of Ps/TiO<sub>2</sub> Nanocomposite Particles” in **International Conference** on “Materials for the Millennium” (MatCon 2010), organized by Department of Applied Chemistry, Cochin University of Science and Technology, Kochi (India) during 11th – 13th January 2010.
  - V. S. Karande, **D. V. Pinjari**, A. B. Pandit and S. T. Mhaske, **Paper presented** on “Ultrasonic Assisted Synthesis of Polystyrene

- Nanomaterials” in International Conference on “Materials for the Millennium” (MatCon 2010), organized by Department of Applied Chemistry, Cochin University of Science and Technology, Kochi (India) during 11th – 13th January 2010.
- **D. V. Pinjari** and A. B. Pandit, **Paper presented** on “Cavitation Based Milling of Rubbery and Rigid Material into Nanomaterials” in National Seminar on “Advanced Synthetic Methodologies and Functional Materials” (ASMFM 2009), organized by Department of Chemistry, Shivaji University Kolhapur (India) during 23rd – 24th December 2009.
  - **D. V. Pinjari** and A. B. Pandit, **Paper presented** on “Cavitation Technology and Its Use in Production of Nanomaterials” in Industrial Green Chemistry Workshop (IGCW) 2009 during 4th – 6th December 2009.
  - **D. V. Pinjari** and A. B. Pandit, **Paper presented** on “Cavitation – An Innovative, Simple and Energy Efficient tool for Synthesis of Natural Cellulose material in a Nano form” in 4th Asian Particle Technology Symposium (an International Conference Event) APT-2009, organized by Indian Institute of Metals and Indian Institute of Mineral Engineerings during 14th – 16th September 2009.
  - **D. V. Pinjari** and A. B. Pandit, **Paper presented** on “Synthesis of Nanomaterials using Cavitation Technique” in CHEMREFERENCE (Annual Research Symposium) 2009, organized by Department of Chemical Engineering, IIT Madras (India) during 22nd – 23rd August 2009.
  - K. Prasad, **D. V. Pinjari**, A. B. Pandit and S. T. Mhaske, **Paper presented** on “Sonochemically Assisted Phase Transformation and Synthesis of Nano TiO<sub>2</sub>: Anatase to Rutile” in 4th Asian Particle Technology Symposium (an International Conference Event) APT-2009, organized by Indian Institute of Metals and Indian Institute of Mineral Engineerings during 14th – 16th September 2009.
  - **D. V. Pinjari** and A. B. Pandit, **Paper presented** on “Sonochemical Synthesis of Poly(Methyl Methacrylate) (PMMA) Nanoparticles” in 4th Asian Particle Technology Symposium (an International Conference Event) APT-2009, organized by Indian Institute of Metals and Indian Institute of Mineral Engineerings during 14th – 16th September 2009.
  - K. Prasad, **D. V. Pinjari**, A. B. Pandit and S. T. Mhaske, **Paper presented** on “Acoustic cavitation assisted sol gel process: Synthesis of nanostructured metal oxides” in CHEMREFERENCE (Annual Research Symposium) 2009, organized by Department of Chemical Engineering, IIT Madras during 22nd – 23rd August 2009.
  - **D. V. Pinjari** and A. B. Pandit, **Work presented** on “Cavitation – A Simple, Energy Efficient and Technological Approach for the Synthesis of Nanomaterials” in 5th Outstanding Young Chemical Engineering Award (OYCE) 2009, organized by Indian Institute of Chemical Engineers Mumbai Regional Chapter (IChE MRC) and D. J. Sanghavi College of Engineering Mumbai (India) during 18th April 2009.
  - **D. V. Pinjari** and A. B. Pandit, **Paper presented** on “Cavitation – A Novel Way To Synthesize Nanoparticles” in International Conference on Nanomaterials and Applications (ICNAMA-2008), organized by Shivaji University, Kolhapur (India) during 9th – 11th December 2008.
  - **D. V. Pinjari** and A. B. Pandit, **Paper presented** on “Synthesis of Cellulose Nanoparticles using Cavitation Technique” in Nanotechnology

and Smart Materials Workshop 2008, organized by Defence Institute of Advance Technology, Pune (DRDO, Government of India) during 11th – 13th November 2008.

- **Presented paper** on “Preparation of Thermoplastic & Thermoset Nanocomposite” in PRODIGY 2006, organized by IChE MRC and UICT Students Chapter, UICT Mumbai.
- **Presented paper** on “Effect of concentrations of epoxy and epoxy blends on performance properties of fiber reinforced composite” in PRODIGY 2006, organized by IChE MRC and UICT Students Chapter, UICT Mumbai.
- **D. V. Pinjari** and M. P. Dhekane, **Paper presented** on “Role of Polymer and Plastics for Infrastructure Development” in Glogift 2005, jointly organized by Rajiv Gandhi Proudयोगiki Vishwavidyalay Bhopal and The University of Alabama Huntsville, USA during 27th – 30th December 2005.
- **D. V. Pinjari** and M. P. Dhekane, **Poster presented** on “Organic – Inorganic Nanocomposites for Coatings” in 3rd International Symposium on Surface Protective Coatings (SSPC-2005), organized by SSPAC and IPA during 14th – 16th November 2005.
- **D. V. Pinjari**, A. S. Sabnis

and David D’Mello, a **poster presented** on “Novel Epoxy for Exterior Application” in 3rd International Symposium on Surface Protective Coatings (SSPC-2005), organized by SSPAC and IPA during 14th – 16th November 2005.

- C. J. Damale and **D. V. Pinjari**, **Paper presented** on “Polymer Layered Silicate Nanocomposites” in CHESS 2005, organized by Siddaganga Institute of Technology, Tumkur Karnatka (India) during 27th - 29th October 2005.
- **Paper presented** on “Biodegradable Plastics” in POLYERA 2005, organized by COET Akola, Maharashtra in September 2005.
- **Paper presented** on “Polymers in Agriculture” in PRODIGY 2005, organized by IChE MRC and UICT Students Chapter, UICT Mumbai.
- **Poster presented** on “Biodegradable Synthetic Polymers for Tissue Engineering” in PRODIGY 2005, organized by IChE MRC and UICT Students Chapter, UICT Mumbai.

### DR. S. M. SONTAKKE

- Keynote address on “Smart polymers” RCOE-IGCTI-2016, March, 2016
- Invited speaker, “Solid waste management” in 4th conference on “waste-uninterrupted resource and encouraging opportunities”

organized by ICT and WTER, 26-27 Nov, 2015, India.

### DR. JYOTI SONTAKKE

- Bioprocessing India 2016, Jyoti Sontakke-Gokhale, 16-18th Dec 2016 at Chandigarh

### PROF. J.B.JOSHI

- Enabling Process Intensification through Computation (EPIC) **seminar** on Banff, Canada

### PROF. LAKSHMI KATAM

- 9<sup>th</sup> ICEC, New Castle, Australia (invited speaker), July 2016
- 3<sup>rd</sup> **International Conference** Green Chemistry during Sep 19-21, 2016 at Las Vegas, USA. (invited speaker)
- 4<sup>th</sup> Indo-French **symposium** on “Catalysis for sustainable and environmental chemistry” in the UCCS, Lille University France from June 27 to 30, 2016, (Invited Speaker)

### EVENTS ORGANIZED :

#### PROF. B.N. THORAT

- 11th International Workshop on Crystallization, Filtration and Drying. Theme: Drying and Granulation Technology, March 2017, ICT, Mumbai

#### PROF. A. M. LALI

- The Kick-off meeting for the BBSRC granted project

titled “Cascade processes for integrated bio-refining of agricultural waste in India and Vietnam (CAPRI-BIO) on 30<sup>th</sup> – 31<sup>st</sup> May 2017.

- The 4<sup>th</sup> Oversight committee meeting was conducted on 22<sup>nd</sup> – 23<sup>rd</sup> May 2017.
- Workshop on “Valorisation of CO<sub>2</sub> & CH<sub>4</sub> from Anaerobic Digestion, Landfill and other Biological Processes” on 9<sup>th</sup> – 10<sup>th</sup> January 2017.

### PROF. A. B. PANDIT

- 15th Meeting of the European Society of Sonochemistry-ESS15 in Istanbul, Turkey, 2016

### PROF. V.K. RATHOD

- SUSCHEME 2015; Workshop on process intensification, 2016; CATSCHOL, 2016

### DR. P.R. GOGATE

- UAA Leadership Lecture and AGM, August 2016
- UAA Annual day celebrations, December 2016
- UAA Foundation Day celebrations, May 2017
- Seminar on Water conservation and recycle, organized by Department of Chemical Engineering, ICT and IChE Mumbai Regional Center, 2017
- OYCE -2017, organized by Department of Chemical Engineering, ICT and IChE Mumbai Regional Center, 2017

### DR. P.D. VAIDYA

- Refresher Course in Biotechnology, Feb 20 – March 11, 2016, University of Mumbai
- Biology for Engineers, January 2017, CoEP, Pune.
- Municipal Solid Waste to Energy, February 2017, RIT, Islampur.
- Laboratory and Ergonomics for Engineers, June 12-16, 2017 at IIT-B.

### DR. R. D. JAIN

- Organizer and Convener of Hands on Training Workshop on Nano Drug Delivery System : **Synthesis, Characterisation and Cellular Imaging**, ICT, Mumbai, India, October 2015
- Organizing Committee member of ‘**Contest of Ideas**’ held during **2nd Innovation Networking-Summit and Exhibition** conducted on April 16, 2016 at Institute of Chemical Technology, Mumbai

### DR. C. S. MATHPATI

- 2 days’ workshop for process intensification using Aspen Plus through COE-PI

### PROF. P.K. GHOSH

- 9th International Workshop on Crystallization, Filtration and Drying. Theme: Drying and Granulation Technology, Feb 2015, ICT, Mumbai
- International Workshop on Waste management of Chemical and Allied

Industries, November 2014, ICT, Mumbai

## PRESENTATION OF STUDENTS

### PROF. A. M. LALI STUDENTS

#### POSTER PRESENTATION

- **Meghna Vanza**, Anup Sonawane and Sandeep Kale, on title “Anthocyanins : Extraction, Purification and Stabilization” in International Conference on “Bioprocessing India – 2016” at Center of Innovative and Applied Bioprocessing (CIAB), Mohali during 15-17 December 2016
- **Sushmita Koley** and Sandeep Kale, “Evaluating ChromSpeed Q and AEX media for negative chromatographic purification of polyclonal antibodies from human plasma” in International Conference on “Bioprocessing India- 2016” at Center of Innovative and Applied Bioprocessing (CIAB), Mohali during 15-17 December 2016.
- **Jagruti Jadhav**, Yogita Pal, Bhavin Patel, Amit P Pratap and Sandeep Kale, “Production of sophorolipid biosurfactant: Media engineering and optimization” in International Conference on “Bioprocessing India 2016” at Center of Innovative and Applied

Bioprocessing (CIAB), Mohali during 15th -17th December 2016.

- **Sushitha T. Nair** and Sandeep B. Kale, “Fermentative production of glycerol for food application” in International Conference on Bioprocessing India 2016 at Center of Innovative and Applied Bioprocessing (CIAB), Mohali during 15-17 December, 2016
- **Anup Sonawane** and Sandeep Kale, “Chromatography For High Volume Products: From Bench Top to Commercialization” in International Conference on Bioprocessing India 2016 at Center of Innovative and Applied Bioprocessing (CIAB), Mohali during 15-17 December 2016.
- **Gargi D. Redkar** and Sandeep Kale\*, “Chromatography coupled with Salt aided precipitation for isolation of Calcium Sennosides” in International Conference on “Bioprocessing India 2016” at Center of Innovative and Applied Bioprocessing (CIAB), Mohali during 15-17 December, 2016.
- **Vikram Choudhari**, Annamma Odaneth and Arvind Lali. “Customised cellulases for optimum cellulose hydrolysis”. Bioprocessing India 2016 Sustainable Bioprocessing Products for Food, Nutrition, Health and Environment held at IISER Mohali, 15 – 17 December 2016.
- **Kurshedaktar Shaikh**, Annamma Anil, and Arvind Lali, “Genome scale engineering of Escherichia coli for recombinant production of cellulases. , Bioprocessing India 2016 Sustainable Bioprocessing Products for Food, Nutrition, Health and Environment held at IISER Mohali, 15 – 17 December 2016.
- **Ranjana Juneja**, Annamma Odaneth and Arvind Lali. “Forward osmosis approach for concentration of protein solutions”. Bioprocessing India 2016 Sustainable Bioprocessing Products for Food, Nutrition, Health and Environment held at IISER Mohali, 15 – 17 December 2016.
- **Parmeshwar Patil**, Annamma Odaneth and Arvind Lali. “High throughput pre-treatment screening and compositional analysis system for biomass compositional analysis” 5th International Conference on Sustainable Utilization of Tropical Plant Biomass: Bioproducts, Biocatalysis and Biorefinery held at Tamil Nadu Agriculture University, Coimbatore, India on 17 – 18 November 2016.
- **Sneha Sathe**, Arvind Lali and Sanjeevkumar Chandrayan. “Overexpression, Biochemical Studies And Application Of A Novel Glucose Tolerant Gh1 Beta-Glucosidase For Biomass Hydrolysis”. 5th International Conference on Sustainable Utilization of Tropical Plant Biomass: Bioproducts, Biocatalysis and Biorefinery held at Tamil Nadu Agriculture University, Coimbatore, India on 17 – 18 November 2016.
- **Chinmayee Mahadik**, Annamma Odaneth and Arvind Lali. “Process for Production of Non- Digestible Cello-oligosaccharides from Agri- Processing waste.”5th International Conference on Sustainable Utilization of Tropical Plant Biomass: Bioproducts, Biocatalysis and Biorefinery held at Tamil Nadu Agriculture University, Coimbatore, India on 17- 18 November 2016
- **Valerie Rodrigues**, Annamma Odaneth, and Arvind Lali. “Polysaccharide breakdown capability of *Pseudoalteromonas-carrageenovoraisolated* from the green macroalgae *Ulva* spp.”5th International Conference on Sustainable Utilization of Tropical Plant Biomass: Bioproducts, Biocatalysis and Biorefinery held at Tamil Nadu Agriculture University, Coimbatore, India on 17- 18 November 2016.



- **Pratik Pawar**, Annamma Odaneth and Arvind Lali. "High cell density cultivation of non conventional yeast" 5th International Conference on Sustainable Utilization of Tropical Plant Biomass: Bioproducts, Biocatalysis and Biorefinery held at Tamil Nadu Agriculture University, Coimbatore, India on 17- 18 November 2016
- **Surabhi Soni**, Sanjeevkumar Chandrayan and Annamma Odaneth. "Production of a thermostable-monoacylglycerol lipase" 5th International Conference on Sustainable Utilization of Tropical Plant Biomass: Bioproducts, Biocatalysis and Biorefinery held at Tamil Nadu Agriculture University, Coimbatore, India on 17- 18 November 2016
- **Manish Yadav**, Monali Kavadia, Annamma Odaneth and Arvind Lali "Eco-friendly and low-cost synthesis route for large scale production of oil based chemicals". Presented at Technology Showcase during IKMC 2016: Accelerating Innovation conference, Hyderabad on 24-25 October, 2016.
- **Chinmayee Mahadik**, Juliet Victoria, Annamma Odaneth and Arvind Lali "Easy and Scalable process for production of oligosaccharides". Presented at Technology Showcase during IKMC 2016: Acceleration Innovation conference, Hyderabad on 24-25 October, 2016
- **Rajesh Vadgama**, Ankita Pawar, Annamma Odaneth and Arvind Lali "Production of CLA enriched milk and milk products". Presented at Technology Showcase during IKMC 2016: Acceleration Innovation conference, Hyderabad on 24-25 October, 2016
- **Sandeep Patle**, Naina Singh Next generation bioprocessing for biopharmaceuticals: Implementation of continuous chromatography in downstream processing of biopharmaceuticals, Vortex-The Chem Fest September, 2016
- **Akanksha Agarwal**, Reena Pandit, Arvind Lali, "Taking algal cultivation towards sustainability: use of alternate nutrient sources" in International conference on 'Advances in Algal Biotechnology' at Vellore Institute of Technology during August 2016.
- **Akanksha Mhatre**, Reena Pandit, Arvind Lali, "Growth engineering of *Ulva lactuca* for year round cultivation in photobioreactors" in International conference on 'Advances in Algal Biotechnology' at Vellore Institute of Technology during August 2016.
- **Surabhi Soni**, Sanjeev K. Chanrayan, Annamma Anil, Arvind Lali. "Designing of Lipase Nanoreactors as Biocatalysts". SSBSS, International Synthetic and Systems Biology Summer School 2016, Volterra, Tuscany, Italy, 9 -13 July, 2016.

## ORAL PRESENTATION

- **Sushmita Koley** and Sandeep Kale, "Affordable alternative to Protein-A: Characterization of novel pseudo-affinity adsorbent and purified antibodies" in International Conference on "Bioprocessing Asia 2016" at Pullman Phuket Arcadia, Phuket, Thailand during 5-8 December, 2016.
- **Snehal Agrawal**, Vinod Amritkar and Sandeep Kale, "A Novel Hybrid and Scalable Process Design for Production of Artemisinin from *Artemisia Annuua*" in International Conference on "Bioprocessing India 2016" at Center of Innovative and Applied Bioprocessing (CIAB), Mohali during 15-17 December, 2016
- **Sharad Narnaware**, Prashant Kumar, Arvind Lali and Sandeep Kale, "Purification of Second Generation Anticancer Isothiocyanate from Broccoli" in International Conference on "Bioprocessing India 2016" at Center of Innovative and Applied

Bioprocessing (CIAB), Mohali during 15-17 December, 2016.

- **Parmeshwar Patil**, Annamma Odaneth and Arvind Lali. "High-Throughput system for Biomass compositional analysis". Bioprocessing India 2016 Sustainable Bioprocessing Products for Food, Nutrition, Health and Environment held at IISER Mohali, 15 – 17 December 2016.
- **Akanksha Agarwal**, Reena Pandit and Arvind Lali, "Taking algal cultivation towards sustainability: use of alternate nutrient sources" in International conference on 'Advances in Algal Biotechnology' at Vellore Institute of Technology during August 2016. Awarded the "Best Young Innovator" for the oral presentation.

## DR. R.D. JAIN POSTER PRESENTATION

- Uday Koli, Sathish Dyawanapelly, Ratnesh Jain, Prajakta Dandekar (2015), Targeting chitosan oligosaccharide nanoplexes to lung cancer cells for enhanced internalization and improved siRNA delivery, Poster Presentation at 42nd Controlled Release Society Annual Meeting and Exposition 2015, Edinburgh, Scotland, July 2015.
- R Akhil Krishnan, Sathish Dyawanapelly, Prajakta

Dandekar, Ratnesh Jain, (2015), Self-assembled nanoconjugate of Amphotericin B and Water Soluble Chitosan, Poster presentation at the 42nd Annual Meeting and Exposition of the Controlled Release Society, Edinburgh, Scotland, July 2015.

- Uday Koli, Sathish Dyawanapelly, Ratnesh Jain, Prajakta Dandekar (2015), Targeting chitosan oligosaccharide nanoplexes to lung cancer cells for enhanced internalization and improved siRNA delivery, Poster Presentation at Society of Biological Chemists India Mumbai Chapter 2015, National Institute for Research in Reproductive Health, Mumbai, India, August 2015
- Rohan Chhabra, Siddharth Shanbhag, Payal Ganguly, M Dhanasekaran, Abhijit Bopardikar, Rohit Kulkarni, Andreas Stavropoulos, Ratnesh Jain, Prajakta Dandekar (2015), In vitro behaviour of human mesenchymal and gingival stem cells on calcium phosphosilicate based scaffolds for potential application in periodontal defects, Poster Presentation at Society of Biological Chemists India Mumbai Chapter 2015, National Institute for Research in Reproductive Health, Mumbai, India, August 2015
- Tejal Pant, Ratnesh Jain and Prajakta Dandekar (2015),

Nanofibrillar cellulose as three-dimensional support for lung culture, Poster Presentation at Seminar on Futuristic Approach to Alternatives, Indian Institute of Technology- Bombay (IIT-B), Mumbai, India, November 2015

- Rohan Chhabra, Manish Gore, Aparna Deshpande, Ratnesh Jain and Prajakta Dandekar (2015), Starch-based scaffolds for potential application in skin tissue engineering, Poster Presentation at Seminar on Futuristic Approach to Alternatives, Indian Institute of Technology- Bombay (IIT-B), Mumbai, India, November 2015
- Prachi Bangde, Prajakta Dandekar Jain and Ratnesh Jain (2015), Green approaches for synthesis of Trimethyl chitosan using Deep eutectic Solvent (DESS), Poster Presentation at 4th Industrial Green Chemistry World International Convention & Ecosystem, Mumbai, India, December, 2015
- Prachi Bangde, Prajakta Dandekar Jain and Ratnesh Jain (2016), Green approaches for synthesis of Trimethyl chitosan using Deep Eutectic Solvent (DESS), Poster Presentation at 15th International Symposium of the Controlled Release Society-Indian Chapter (CRS-IC) 2016 (Advances in Technology and Business



- Potential of New Drug Delivery Systems), Institute of Chemical Technology (ICT), Mumbai, India, February 2016.
- R Akhil Krishnan, Pranjal Deshmukh, Siddharth Agarwal, Deepa Dhoble, Poorvi Purohit, Prashant Waske, Dileep Khandekar, Prajakta Dandekar, Ratnesh Jain, (2016), Interaction of Chitosan with a Carbon based solid acid, Oral Presentation at CATSCHOL 2016 : One day workshop on Catalysis, Institute of Chemical Technology (ICT), Mumbai, India, February 2016.
  - Prachi Bangde, Ratnesh Jain and Prajakta Dandekar Jain (2016), Exploring enzymatic catalyst for modifying chitosan using Deep Eutectic Solvents (DESS), Oral Presentation at CATSHOL-2016, Institute of Chemical Technology (ICT), Mumbai, India, February 2016
  - Tejal Pant, Ratnesh Jain and Prajakta Dandekar (2016), In vitro 3D model of lung for pre-clinical testing of drugs and their delivery systems, Poster Presentation at Controlled Release Society-Indian Chapter, Institute of Chemical Technology, Mumbai, India, February 2016.
  - Uday Koli, Ratnesh Jain, Prajakta Dandekar (2016), Active Targeting of Lung Cancer Cells with Chitosan Oligosaccharide siRNA Nanoplexes, Poster Presentation at 15th Controlled Release Society-Indian Chapter Symposium 2016, Institute of Chemical Technology (ICT), Mumbai, India, February 2016
  - R Akhil Krishnan, Siddhant Prabhu, Jay Sheth, Ratnesh Jain and Prajakta Dandekar (2016), Synthesis and Antifungal studies of Chitosan Oligosaccharide-Zinc oxide nano composites, Poster Presentation at 15th International Symposium of the Controlled Release Society-Indian Chapter (CRS-IC) 2016, Institute of Chemical Technology (ICT), Mumbai, India, February 2016.
  - Pallavi Wadke, Vijaya Waghmare, Ratnesh Jain and Prajakta Dandekar (2016), Electrospun starch based nanofibrous mat for wound healing, Poster Presentation at 15th International Symposium of the Controlled Release Society-Indian Chapter (CRS-IC) 2016, Institute of Chemical Technology (ICT), Mumbai, India, February 2016.
  - Prachi Bangde, Ratnesh Jain and Prajakta Dandekar (2016), Green Approach for Synthesis of Trimethyl Chitosan, a Polymer of Importance in Biomedical Applications, Poster Presentation at 15th International Symposium of the Controlled Release Society-Indian Chapter (CRS-IC) 2016, Institute of Chemical Technology (ICT), Mumbai, India, February 2016.
  - Saurabh Patil, Mahesh More, Prajakta Dandekar, Aditya Pattani, Ratnesh Jain (2016), Performance Evaluation Study for Chitosan Oligosaccharide as a Pharmaceutical Excipient, Poster Presentation at 15th International Symposium of the Controlled Release Society-Indian Chapter (CRS-IC) 2016, Institute of Chemical Technology (ICT), Mumbai, India, February 2016.
  - Rohan Chhabra, Aparna Deshpande, Ratnesh Jain and Prajakta Dandekar (2016), Starch/Gelatin Based Scaffolds for skin tissue engineering, Oral Presentation at 15th International Symposium of the Controlled Release Society-Indian Chapter (CRS-IC) 2016, Institute of Chemical Technology (ICT), Mumbai, India, February 2016.
  - Anurag Dhobal, Aanshu Deokuliar, Amol Kulkarni, Prajakta Dandekar and Ratnesh Jain (2016), Continuous platform for the controlled synthesis of polymeric nanoparticles, Poster Presentation at 15th International Symposium of the Controlled Release Society-Indian Chapter (CRS-IC) 2016, Institute of Chemical Technology (ICT), Mumbai, India,

- February 2016.
- Sathish Dyawanapelly, Goutam Ghosh, Prajakta Dandekar and Ratnesh Jain (2016), Effect of pH on protein-nanoparticle electrostatic interaction, Poster Presentation at 15th International Symposium of the Controlled Release Society-Indian Chapter (CRS-IC) 2016, Institute of Chemical Technology (ICT), Mumbai, India, February 2016.
  - Sathish Dyawanapelly, Goutam Ghosh, Prajakta Dandekar Jain, Ratnesh Jain (2016), "Effect of pH on Protein-Nanoparticle Electrostatic Interaction", presented poster at 43rd Annual Meeting & Exposition of the Controlled Release Society, Seattle, Washington, July 17-20, 2016
  - Uday Koli, Pradeep Bhartiya, Deepak Modi, Ratnesh Jain and Prajakta Dandekar Jain (2016), Gene silencing using chitosan oligosaccharide-siRNA nanoplexes for alleviating lung diseases, Poster Presentation at CRS Annual Meeting & Exposition, Seattle Washington USA, July 2016.
  - Rohan Chhabra, Aparna Deshpande, Ratnesh Jain and Prajakta Dandekar. (2016) Novel Starch Based 3D Scaffolds as Dermal Substitute for Skin Tissue Engineering. , Poster Presentation at CRS Annual Meeting & Exposition, Seattle Washington USA, July 2016.
  - R Akhil Krishnan, Sathish Dyawanapelly, Tejal Pant, Ratnesh Jain, Prajakta Dandekar (2016), Protective nature of low molecular weight chitosan in a Chitosan-Amphotericin B (C-AMP) nanocomplex, Poster presentation at 11th Asia Pacific Chitin and chitosan symposium and 5th Indian Chitin and Chitosan Society Symposium, IMA House, Kochi, India, September 28-30, 2016.
  - Nikhil Kalane, R Akhil Krishnan, Ratnesh Jain, Prajakta Dandekar (2016), Synergistic effect of hetero and homo catalysts on the synthesis of 5-hydroxymethyl furfural (HMF) from chitosan, Poster presentation at 11th Asia Pacific Chitin and chitosan symposium and 5th Indian Chitin and Chitosan Society Symposium, IMA House, Kochi, India, September 28-30, 2016.
  - Saurabh Patil, Akhil R Krishnan, Shashank Bangde, Prajakta Dandekar and Ratnesh Jain, Comparison between solid & Liquid catalyst for production of low molecular weight chitosan, 11th Asia Pacific Chitin and Chitosan Symposium & 5th Indian Chitin and Chitosan Society Symposium 2016.
  - Prachi Bangde, Ratnesh Jain and Prajakta Dandekar Jain (2016), Green approach for synthesis of Trimethyl Chitosan, poster Presentation at 11th Asia Pacific Chitin and Chitosan Symposium & 5th Indian Chitin and Chitosan Society Symposium, Kochi, Kerala, India, 28th-30th September 2016.
  - Aanshu Deoukuliar, Ratnesh Jain and Prajakta Dandekar (2016), Optics within Life Science, Tata Institute of Fundamental Research(TIFR), Mumbai, India
  - Tejal Pant, Nanda Rohra, Ratnesh Jain and Prajakta Dandekar (2016), Cell Factories, Indo-US Workshop, IIT-BOMBAY, Mumbai, India.
  - Kritika Gupta, Nanda Rohra, Ratnesh Jain and Prajakta Dandekar (2016), The Bioproduction 2016-Asia Pacific, Hyatt Regency, Mumbai, India.
  - Kritika Gupta, Nanda Rohra, Ratnesh Jain and Prajakta Dandekar (2016), Evolutions Symposium 2016- GE Healthcare Life Sciences, The Grand Hyatt, Santa Cruz, Mumbai, India

## INDUSTRIAL CONSULTANCY:

- Azista Industries Pvt Limited
- J S Industries
- Pidilite Industries Limited
- Harman Finochem, Limited
- SS Techno Ltd.
- Nerolac kansai

- Aquapharm
  - Galaxy surfactants
  - Marico
  - HUL
  - Jayant agro
  - K V Fire
  - GSK
  - Balmer Lawrie
  - Aditya Birla Science and technology
  - General Mills INC
  - Privi Organics Pvt Ltd, Navi Mumbai
  - India Glycols Ltd. Kashipur
  - Acme Synthetic Chemicals
  - Mitsubishi Chemicals India Pvt. Ltd., Delhi
  - Abhay Cotex Pvt. Ltd., Jalna
  - Enzymatic Production of Ascorbyl Palmitate
  - Soy Protein Pilot Plant
  - SRF Ltd, New Delhi, Design of mixing equipments
  - Unilever Ltd, Bangalore, India
  - Eastman Chemical Co. Ltd., USA.
  - Bharat Petroleum Corporation limited (BPCL)
  - Atul Pvt.
  - Asian Paint
  - Val Organics Pvt. Ltd, Mumbai, India
  - National Peroxide Limited
  - Lubrizol India Limited
  - Siemens India Limited
  - Sudarshan Chemical Industries Limited
  - Hindustan Chemical
- Company: Process and product advice
- NOCIL Ltd.
  - M/s. Jubilant Life Sciences Ltd.
  - M/s. DU Organics Pvt. Ltd.
  - M/s. Megafine Pharma (P) Ltd.
  - M/s. IG Petrochemicals Ltd.
  - M/s. Godrej Agrovet Ltd.
  - M/s. Aditya Environmental Services Pvt. Ltd
  - M/s. Crop Care Federation of India
  - M/s. IPCA Laboratories Ltd.
  - M/s. Jubilant Life Sciences Ltd.
  - M/s. Vinati Organics Ltd.
  - Y-Cube Technologies Pvt. Ltd
  - Mangalam Organics
  - PACE, India
  - Indian Oil Corporation Ltd.
  - Atul Ltd.
  - Hetero Drugs Limited
  - Anya Biopharma, Taiwan
  - Famy Care Limited
  - Thrombocheck Labs
  - Glaxo Smith Kline
  - Emami
  - United Phosphorus Ltd
  - Coca-Cola Ltd. Shanghai (China)
  - GTF Marine Technology India Pvt. Ltd., Mumbai (India)
  - Department of Revenue Intelligence, Ministry of Commerce, Government of
- India
- Farmsons Cropcare Pvt. Ltd., Nashik (India)
  - Swagat Polymers, Aurangabad (India)
  - Elkay Chemicals Pvt. Ltd., Pune (India)
  - ACIL Ichalkaranji (India)
  - P&P Products Pvt. Ltd., Parbhani (India)
  - Zero D Industries Ltd, Mumbai (India)
  - Municipal Corporation of Greater Mumbai (MCGM), Mumbai
  - Hindustan Lever Research Center, Bangalore (India)
  - Famy Care Pvt. Ltd., Mumbai (India)
  - GAIL (India) Ltd
  - Maharashtra Pollution Control Board
  - Asian Paints (As Member of their Technology Council)
  - Atul Ltd., Valsad
  - Rubamin Ltd., Vadodara
  - Uniqflux Membranes, Pune(honorary)
  - Eternis
  - Alkyl Amines
  - Laxmi Organic
  - UPL
  - Technoforce.
  - Vinati Organics
  - GACL

# MAJOR ACCOMPLISHMENT

## PROF. B. N. THORAT

- Although considerable amount of techniques are developed to dewater waste activated sludge not many ETPs and CETPs in India are using them practically. The resources found in municipal wastewater treatment sludge, more recently called bio-solids, are rich in nutrients and energy along with some minor components. Therefore, on-site filtration experiments were carried out at the local CETPs. The consequences of several operational parameters such as effect of pressure, filtration media, coagulant addition, etc. were studied. The characteristic properties such as cake resistance, medium resistance, cake porosity, cake compressibility were also determined along with the elemental analysis of the cake. It was found that the CETP is not operating at the optimum conditions. This data will enable us to intensify the CETP operations and consequently minimize the operating costs.
- Turmeric, traditionally known as Haldi, an important medicinal plant and spice, is produced by 15 lakh farmers on 5,00,000 acre of land. Traditional turmeric processing is laborious, consumes 30 days and costs Rs. 30,000/acre. The processing also leads to non-

availability of the land for the next crop for considerable time period. HaldiTech is a novel technology developed during Ph.D. work that can process 10,000 kg of turmeric (produce of 1 acre) in 24 hrs with targeted Rs. 15,000 as against traditional process that takes 30 days and costs Rs. 30,000. HaldiTech targets Rs. 1500 crore annual market of turmeric processing through agri-waste based novel drying technology.

- Jaggery is a traditional Indian sweetener but has been replaced by sugar in Indian household because of its hygroscopic nature. The importance of jaggery as a sweetening agent has increased recently because of its medicinal properties. Thus there is need to make jaggery available in free flowing powder form. This study analyses strategies for granulation of jaggery and difficulties encountered in upscaling of the process.
- Slack coal, generated during the process of mining, transportation, handling and on exposure to the weather, can be utilized effectively by forming briquettes, which otherwise goes waste or sold at low price. Briquetting of slack coal involves binder, which is driving factor for economic consideration. In Present study, efforts are being made to develop cost effective binder or sustainable binding

technique.

- Solar conduction dryer (SCD) is a unique technology that uses conduction, convection and radiation mechanism of heat transfer making it one of the most efficient system. The SCD is one of the most effective piece of equipment and it has tremendous potential in India and other erstwhile nations where there is abundance of solar insolation. The most cost-effective dryer which runs on no electricity needs further understanding for the improved performance. The objective of the proposed is to understand the flow pattern, temperature profile and impact of various design parameters of SCD on drying. Based on the experimental insights, CFD models has been developed to quantify the effect of design and operating conditions.
- Most of the drugs, nutraceuticals like vitamins, probiotics have their stability issue. They are prone to thermal, oxidative, photolytic, acid degradation. It is very necessary to deliver them on targeted site without degradation. Microencapsulation is the one of the technique used to increase stability, bioavailability and solubility of nutraceuticals. Spray drying, extrusion, solvent evaporation, fluid bed

drying techniques are used for microencapsulation.

- Grand Challenges India Project “Ensure year-wise nutritional food security to Indian Women through Community level implementation of Domestic Solar Conduction Dryer (SCD)” [Supported under Grand Challenges India, funded by BIRAC, Gates Foundation, USAID and DBT]. In this project, SCD was provided to 230 rural women farmers in Aurangabad and Shahapur, Maharashtra, so that they can preserve seasonal produce, consume it during lean period to overcome malnutrition and earn additional income through sale of dehydrated food products. Nutritional labeling of 20 fruits and vegetables have been carried out to estimate the retention of nutrients in SCD-dried food as compared to fresh.

### PROF. S. S. BHAGWAT

- In the area of thermodynamics, we have employed a novel technology for refrigeration that is a combination of Vapour Absorption Refrigeration system (VAR) & Vapour Compression Refrigeration system (VCR) called “COMBO VAR-VCR TECHNOLOGY”. The combination has been optimized by the use of Exergy Engineering techniques such that an optimum use of both

technologies results in maximum benefits. It reduces electrical energy consumption by using heat as an energy source. The heat can be obtained by solar collector or by agro waste through a boiler generating steam or by direct combustion of agro waste. This novel technology has been already successfully implemented at one of the milk chilling centers of Gokul Dairy, Kolhapur, where approx. 2 lakh liter of milk is being chilled everyday using this technology. This technology is being used for storage of fruits and vegetables, dairy products, medicines, etc.

### PROF. V. G. GAIKAR

- Professor Vilas G. Gaikar, a fellow of Indian National Academy of Engineering, has made outstanding research contribution to Chemical Engineering Science that has been applied by many industries in India and abroad. His work on Dissociation extraction and dissociation extractive crystallization has been practiced in chemical industry where the other conventional methods of separation have been either economically impractical or are difficult to employ. His process of reactive crystallization for m-/p-cresols was the first of its kind with extreme selectivity for separation of this most difficult-to-separate mixture.

- Innovative approaches by synergizing theoretical developments with practical applications are hall marks of the work done by Professor Gaikar in academic research and as a consultant to several industrial concerns in the last two decades. He had been a consultant to a leading alcohol-based industry for development of many new extraction and purification processes for natural products as medicinal compounds or nutraceuticals. Many of these processes have been patented by the company and practiced for commercial production of the products. As a Chair Professor on a position created by Bharat Petroleum Corporation Ltd. in the Institute of Chemical Technology (ICT), he has developed newer and novel technologies for the company, most recently for upgradation of vacuum residue and waste water management. He had developed a large number of oleochemicals from castor oil that were manufactured and marketed by another industrial concern.
- Professor Gaikar extended his work on reactive separations to complex distillation columns including reactive distillation, salt effect in distillation and complex heterogeneous azeotropic distillation column designs. In particular, he had analyzed and successfully showed economical operation for a



multicomponent azeotropic distillation column involving acetic acid-water mixtures in India's leading petrochemical company.

- In the last few years, his group has developed several reactive sorbents for heavy metal extraction with extreme selectivity towards desired metal ions, affinity adsorbents for a number of closely related organic compounds, functionalized sorbents for capture of carbon-dioxide and nanoparticle synthesis having potential applications in pharmaceutical and specialty chemical industries. Currently, his group is working on several specialty chemicals' synthetic reactions for development of continuous processes to improve selectivity to desired product and to minimize waste with energy integration.
- In the area of Biofuels, biolubricants, biodiesel, thermochemical conversion of biomass, his group has attained several newer milestones and some of this work has been used at industrial and large scale applications. The thermal conversion of lignocellulosic biomass is being developed to establish biorefinery concept. Another offshoot of this work is establishing, 'Steam Pyrolysis' as a waste treatment technique for dealing with concentrated organic waste.
- His contribution to the field

of hydrotrophy and complex mixtures with surfactants has been pioneering, especially considering that his contribution has come entirely from the work done in ICT, India. His work, for the first time, established sodium ibuprofen as an efficient hydrotrope and drug solubilizer which is now being used in several drug formulations. He has also developed several formulations of hydrotropes with surfactants for potential applications in drug and pesticide industries. His group has successfully developed aqueous solutions of hydrotropes based extraction process for natural products as an alternative to organic solvents that is also easily scalable to industrial operations. Recently his group has successfully conducted delignification using aqueous solutions of hydrotrope as a substitute for chemical conversion techniques. The aqueous solutions are also useful in conducting organic synthesis as safer media and provide ease of recovery of products. His work on biochemical applications, using organic solutions of reverse micelles, is also recognized as first of its type, mostly for enzyme and protein recovery by cell permeabilization and purification.

- Apart from his industrial and corporate relations, Professor Gaikar was rated as the Best Teacher by University of Mumbai in

2002 and several times by the students of the Institute. He is known for his innovative and out-of-box ideas for promoting engineering and technical education in the country, and inspiring young engineers to innovate. His originality in conceptualizing the Industry-Academia interaction in the form 'Young Innovator Choice Competition' in ICT has brought young chemical engineers/ technologists from all corners of the country and several industries seeking innovative answers for their problem, on the same platform. This year, he conceptualized the idea of 'Innovation Networking' of engineering institutes in the State of Maharashtra and is spearheading the efforts of ICT in spreading the spirit of Innovation among young engineers

## INNOVATION NETWORKING OF TEQIP INSTITUTES:

The MHRD had invited Professor Gaikar, a couple of years ago, to brain storm on the activities of TEQIP to improve Industry -Institute of Interaction, along with IIT, Kanpur, IIM-Calcutta and Indian school of Business, Hyderabad, amongst other Institutes. The need of establishment of **Innovation and Technology Park** was acutely felt by all participants to convert the research done in different laboratories. The **Innovation Networking of TEQIP Institutes in the state**

of Maharashtra has been a result of the meetings at MHRD and the brain storming sessions held at different Institutes in Maharashtra. The project was whole heartedly supported by the State of Maharashtra and the National Project Implementation Unit (NPIU), TEQIP. It was envisaged that the Innovation Networking would use current expertise and infrastructure available at the partner institutes to develop/create prototypes for technology development and transfer. It was also hoped that the spirit of innovation would be spread to other states to enthuse young engineers and technologists for entrepreneurship. ICT has become now a hub for networking with other Institutes under the guidance of Professor Gaikar under TEQIP to promote this spirit of Innovation.

Institute of Chemical Technology (ICT, Mumbai), Veermata Jeeja bai Technological Institute (VJTI, Mumbai), Dr. Babasaheb Ambedkar Technological University (DBATU, Lonere), Sardar Patel College of Engineering (SPCE, Mumbai) and Shri Guru Govind Singh Institute of Engineering and Technology (SGSIET, Nanded), signed MoU on 1st April 2014 to launch formally the Innovation Networking with 14 projects. The success of these projects was not with the project investigators but with the bunch of youngsters and PhD students who sacrificed their vacations to work on the ideas. The entire exercise is now turned into Human

Resources Development, Project Management and Inventory Management, apart from the Product Engineering

### PROF. A. B. PANDIT

Prof. A. B. Pandit can be described as singularly responsible individual who proposed and promoted Hydrodynamic Cavitation based physico-chemical and biological transformations. His first publication in the area of hydrodynamic cavitation for Chemical Transformation was in 1992. He has subsequently published over 120 articles till date in the area of cavitation. He has applied this technique for a variety of applications from laboratory to industrial scale (mg to tonnes/day level). The range of applications include: (a) Biotechnology for intracellular enzyme recovery (b) Chemical Engineering and Technology for sonocrystallization, estrification of variety of compounds and nanoparticle synthesis. Successful technologies have also been developed for a social cause such as water disinfection for rural masses. A unique blend of theory, modeling, experiments and final implementation has resulted in a successful design and scale-up of cavitation reactors from lab to industrial scale. His insights into the fundamental understanding of Cavitation reactors (termed coined by him) has opened a gamut of possible applications of these reactors. His work in the area of effluent water treatment of biorefractory pollutants mineralization and/or prevention of chemical

less biofouling prevention in cooling tower circuits has been path breaking, The technology of Ballast water treatment proposed by him along with (National Institute of Oceanography and National Chemical Laboratory) CSIR labs has been well recognized by International Maritime Organization. This is likely to result into an independent sea water treatment technology testing facility, first time in India.

His current work in hand pump based water disinfection for rural India is revolutionary in nature and will be extremely useful in the developing countries as it has resulted into a modified hand-pump design giving in excess of 89% disinfection in one pass. His contribution to ICT ENERGY group has resulted into energy efficient processes for cooking, solar steam generation and efficient smokeless Solid Fuel Chullas (Stoves) designs.

He has developed novel designs for a variety of Cavitationally induced chemical, biological and physical transformations unit processes which are in successful commercial operations.

A unique scientific creative approach of using fundamental knowledge, coupled with simple, elegant experiments demonstrating Industrial and Social utility has been the hallmark of Prof. Pandit's contribution to Science and Technology. Prof. Pandit has authored over 333 (as per



Scopus) publications, 6 books and over 17 chapters and has 17 patents with over 11416 citations (as per Scopus webmedia) and H-Index 57. He is also on the Editorial board of several International Scientific Journals. He has successfully guided 38 PhD's and 68 Master's students in Engineering and Technology so far.

## DR. ANAND VINAYAK PATWARDHAN

### Membrane separation (separation and recovery of organic chemicals and metals from organic and aqueous streams; pollution control; development of ceramic membranes)

- Separation of various metal ions from aqueous streams using supported liquid membrane
- Separation using hollow fibre membrane as well as flat sheet membrane
- Separation of metal ions like U, Nd, Pb, Co, Zn, Sr, Cs, and their mass transport parameters
- Separation of organic acids from aqueous stream using the flat sheet supported liquid membranes
- Scale-up from laboratory scale to industrial scale equipment
- Removal of sulphur compounds from various petroleum fractions
- Mathematical modelling of membrane separation phenomena

- Development of ceramic membranes for industrial applications

### Green Technology (ionic liquids for solvent extraction and reactions; value-added chemicals from non-edible oils; greener organic chemical process development)

- Enantioselective synthesis, kinetic resolutions of racemic mixtures, chiral molecular recognition, group transfer reactions using chiral auxiliaries / catalyst, synthetic organic chemistry for pharmaceutical aspects.
- Multiphase catalysis relies on the transfer of organic substrates into the catalyst phase or on catalysis at the phase boundary. Most organic substrates do not have sufficient solubility in the catalyst phase to give practical reaction rates in catalytic applications. The catalytic / solvent role of ionic liquids in such cases is being explored for some industrially relevant reactions.
- Epoxidation of edible and non-edible oils for industrially useful chemicals.
- Separation of C7 and C8 liquid mixtures with ionic liquids as extracting solvents.

### Bioprocess Technology (synthesis of chemicals and microbial colorants / pigments)

- Development of viable and

efficient bioconversion process for the production of the L-ascorbic acid from inexpensive starting materials, such as, glucose.

- Development of analytical method for simultaneous quantitative estimation of L-ascorbic acid and 2- keto-L-gulonic acid.
- Effect of precursor addition on the production of L-ascorbic acid during fermentation.
- Effect of intracellular enzyme inhibitor on the yield of L-ascorbic acid.
- Production of natural colours or pigments by screening various microbes producing natural pigments / colours, and the development of a fermentation process for the same as the use of fermentation processes possess a number of advantages when compared to vegetable sources, including the possibility of continuous cultivation, and the rapid multiplication of microorganisms.

### Major Accomplishments :

- Separation of various metal ions and organic acids from aqueous streams using supported liquid membrane. This is relevant for recovery of metals as well as in industrial pollution control. Scale-up from laboratory scale to industrial scale equipment is in progress.
- Separation of racemic aldehydes using vicinal

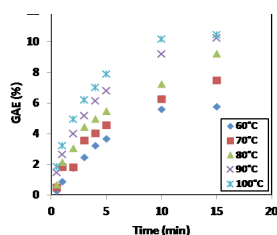
diamines as chiral auxiliary has been successfully demonstrated at laboratory scale.

- Friedel-Crafts alkylation of phenols using ionic liquids as catalysts has been successfully demonstrated at laboratory scale.
- In-situ epoxidation of non-edible oil using hydrogen peroxide has been achieved. This epoxidised oil is found suitable for making plasticisers.
- An innovative biotechnological approach for the production of L-ascorbic acid (vitamin C) has been successfully developed.
- Production of natural colorants using microbes has been accomplished, and the application of the same has been successfully tried for dyeing of natural fibres.

## PROF. A.W. PATWARDHAN

### Kinetics of Tea Polyphenol Infusion

Tea contains polyphenols and methyl xanthenes, along with other compounds like tannic acid, thearubigins and theaflavins, etc.



The objective of the research

work is to improve the infusion kinetics of conventionally used tea bags. Concerning this, swelling and infusion kinetics of tea bags were determined for various parameters. Effect of temperature, particle size, bag dipping and size of tea bag was determined for tea bags containing CTC black tea. An increment of 81% was observed in infusion profile of CTC black tea as brewing temperature was increased over 60-100 °C. It was observed that reduction in particle size and increment in temperature, dipping frequency and size of tea bag led to improvement in infusion profiles of tea bags.

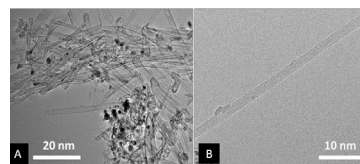
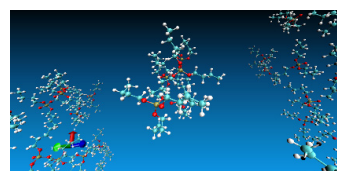
### Modeling of Two Phase Flow Instabilities in Vertical Tube Boiling Evaporators

Two phase flow boiling in vertical tube mainly occurs in steam generator in nuclear power plants, thermal power plants, electronic cooling systems etc. Subcooled boiling is important phenomenon as it deals with high heat transfer coefficient and non-uniform vapor distribution. In order to predict subcooled boiling flow behavior, effect of boiling parameters models, Non-drag forces, effect of turbulence models on axial and radial distribution of vapor fraction and liquid temperature has been studied. Based on comparison study, CFD model has been developed. Applicability of developed CFD model has been checked against experimental studies. It was observed that developed CFD model has potential to predict two phase

pressure drop in vertical tube.

### CFD simulation of lab scale Asymmetric Rotating disc contactor (ARDC)

Asymmetric rotating disc contactor (ARDC) is the modified version of rotating disc contactor (RDC), which is widely used for liquid-liquid extraction. ARDC provides better stage wise contact than RDC by reducing back mixing. For efficient design and scale-up, it is necessary to study the effect of various geometry parameters and operating conditions. In the present work, computational fluid dynamics (CFD) simulations were carried out to study hydrodynamics of ARDC. The results of CFD were validated using experiments. The hold-up of dispersed phase, effect of discs and impellers (disc with 4 blades at 45°) on flow pattern and hold-up in ARDC was studied. An increase in rotation speed resulted in an increase in hold-up. Substantial increase in hold up after 400 rpm is attributed to the strong agitation effects.



### Thermodynamics of extraction systems.

The study of Liquid-liquid extraction (LLE) processes at molecular level is an important

aspect. Reliable molecular level description of extractant diluent and solute is essential for understanding LLE. One way to study such systems is molecular dynamic simulations (MD). Tributyl phosphate (TBP) and di-(2-ethylhexyl) phosphoric acid (D2EHPA) are versatile extractants. These extractants are usually deployed with inert diluents such as kerosene, paraffin etc. The objective of the present work was to quantify extractant solute interactions using free energy calculations in case of lithium extraction from aqueous stream using TBP and D2EHPA. MD simulations were performed using GROMACS. Pure component properties of TBP, D2EHPA and dodecane were simulated. The physical properties were found to be in good agreement with the experimental properties. Figure: Snapshot of tributyl phosphate (TBP) aggregate during MD simulation in dodecane. (Dodecane not shown for clarity)

### Synthesis of single walled carbon nanotubes: Kinetics and Reaction mechanism

Single walled carbon nanotubes (SWCNTs) have been synthesized by thermocatalytic decomposition of methane by using ferrocene as the catalyst at atmospheric pressure. A floating catalyst chemical vapour deposition reactor was employed to investigate the kinetics. The effects of temperature of synthesis (800 - 1000 °C), partial pressure (2 to 40 kPa) of reactant gas and catalyst concentration (0.2 to 4.6 mol m<sup>-3</sup>) on the rate of decomposition of methane have been studied. A reaction mechanism has been proposed and irreversible dissociative adsorption of methane on the catalytic active site followed by the irreversible decomposition of the adsorbed methyl group is found to be the rate controlling step. The synthesized SWCNTs exhibits high crystallinity. Figure: (A) TEM image of bundled SWCNTs produced using methane, ferrocene and sulphur as carbon source, catalyst and promoter respectively. (B) TEM image of individual SWCNT.

With gas liquid dispersed two phase flow in a vertical pipe, wall peak as well as core peak phenomena is observed. CFD model has been developed which is well capable of prediction of radial distribution of gas void fraction and liquid and gas velocity for low and high (Reb) cases. Figure: Contour plots of radial distribution of gas void fraction (a-b) and comparison of experimental and simulated results of radial distribution of gas void fraction (c-d).

### Synthesis of doped Carbon Nanotubes

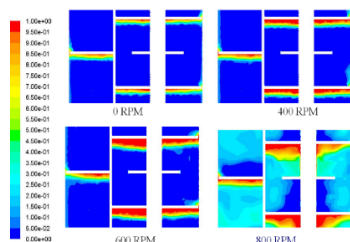
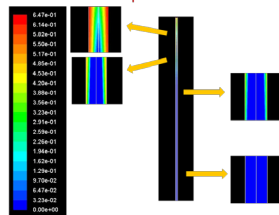
Boron doped carbon nanotubes were synthesized using chemical vapour deposition, with acetylene as a carbon source and boric acid as boron source. The important parameters determining the rate of reaction included, temperature, partial pressure, flow rate and catalyst concentration. The temperature variation (650°C to 950°C) showed existence of different mechanisms with different activation energies. The flow rate studies depicted that the flow rates above 2400 sccm and 2.4 g catalyst weight were responsible for eliminating the mass transfer diffusion limitations. It was found that the adsorption of the species was a rate determining steps. BCNTs produced did not have a well-defined morphology and the boron content in the B-CNT lattices was found to be between 6-7 percent.

### Hydrodynamics of multiphase flow in pipes

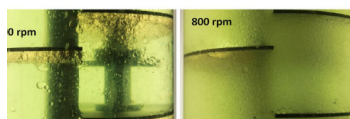
The prediction capability of two-fluid model for gas liquid dispersed two phase flow depends on the accuracy of the interfacial forces. The interfacial forces such as drag, lift, wall lubrication and turbulent dispersion play an important role in the prediction of radial distribution of gas void fraction.

### CFD simulations of Asymmetric rotating disc contactors

Contours of vapor volume fraction



Phosphoric acid is an important secondary source of uranium. In the present work, hydrodynamics characteristics and mass transfer performance of a multi-impeller column for extraction of uranium from phosphoric acid was studied. Effect of operating parameters like impeller speed, phase velocities on drop size and size distribution, hold up and, flooding velocities and mass transfer coefficient were evaluated. Drop size distribution was strongly affected by impeller speed. It was observed that increase in impeller speed and continuous and dispersed phase velocities leads to enhancement in hold up of dispersed phase as seen in figure. The experiments showed that flooding occurred in bottom stages of the column. Almost 100 % extraction of uranium was observed at impeller speed of 250 rpm. The height of mass transfer unit obtained at 250 rpm was 0.13 m at  $V_c = V_d = 1$  mm/s, which indicates the high performance of multi-impeller column for extraction of uranium



## DR. V. K. RATHOD

### Studies in extraction and purification of bioactive molecule from natural sources

The interest in traditional medicines is growing substantially since several modern drugs are banned due

to their increased side effects apart from being expensive. India has a rich array of registered and widely popular medicinal plants. Mangiferin is a major component of mango leaves and is an important natural drug with wide applications in pharmaceutical and other related industries as mentioned by Sato et al. It shows antioxidant, antitumor and antiviral properties. The present work will involve use of novel extraction processes such as ultrasound assisted extraction (UAE), microwave assisted extraction (MAE) and adsorptive purification of the natural product. In (UAE). Effect of various extraction process parameters such as extraction solvent, extraction time, temp, frequency on extraction yield will be studied. Most significant parameters would be find out and statistical optimization of most significant process parameters to get maximum yield. This study also aims towards understanding the kinetics and to develop the model for this extraction process under different parameters to predict extraction rate constant, initial extraction rate and equilibrium concentration. Final purification is carried out by adsorption chromatography.

### Studies in enzyme immobilization

Enzyme immobilization onto solid carrier is one of the effective techniques which not only stabilizes enzymes under operational conditions but also allows easy recovery and reusability for multiple cycles

. Generally, immobilization of enzyme on the carrier involves synthesis of functionalized carrier and covalent cross-linking of enzyme on its surface. Over the past decade, a number of nano-carriers have been prepared and used as a support for immobilization of enzyme. Among different types of carriers, magnetic nanoparticles (MNPs) are significantly used as a support due to their unique characteristics such as their tailored surface chemistry, unique physicochemical properties, biocompatibility, biodegradability. Also, magnetic nanoparticles allow easy, quick and efficient separation of enzyme from the reaction mixture by using external magnet. Pectinase was immobilized onto chitosan magnetic nanoparticles (CMNPs) by dextran polyaldehyde as a macromolecular cross-linking agent. The parameters like cross-linking concentration, time and CMNPs to enzyme ratio were optimized. Further, prepared magnetic pectinase nanobiocatalyst was characterized by FT-IR and XRD. The thermal kinetic studies for immobilized pectinase showed two folds improved thermal stability in the range as compared to free form. The  $V_{max}$  and  $K_m$  values of immobilized pectinase were found to be nearly equal to native form which indicated that conformational flexibility of pectinase was retained even after immobilization. Finally, magnetic pectinase nanobiocatalyst was employed



for apple juice clarification which showed turbidity reduction upto 74% after 150 min treatment.

### **Hydrodynamics and Mass Transfer Studies in Pulsed Sieve-plate Extraction Column and Mixer-settler**

The complex behavior of the hydrodynamics and mass transfer performance, leads to difficulties in the design and performance of pulsed sieve plate extraction column. Dynamics and mass transfer in a liquid-liquid extraction column are essentially determined by the behavior of the dispersed phase. It seems obvious that the changes in the characteristics such as hold-up, drop size, axial dispersion, flooding in the column have to be considered in order to describe conveniently the hydrodynamics of the column. Many empirical models for predicting the hydrodynamics in a liquid-liquid extraction column has been proposed and reviewed by various investigators.

The research work aims at the experimental study of the effect of operating and design variables for elucidation of hydrodynamics of the pulse sieve plate extraction column using various types of plate and different column configuration and the description of a mathematical model and the different algorithms which would be developed for the simulation of extraction column. The Phase Reversal studies have been carried out in a Pulsed Sieve Plate extraction column 0.152 m in diameter.

Remotely operated Combined Air-lift Mixer-settler Unit will be studied in detail for its easiness of operation. Mixer-Settler provide good mixing and reasonably good phase separation performance but rather large hold-ups. Each mixer-settler unit provides a single stage of extraction. Mixer-settlers are used when a process requires longer residence times and when the solutions are easily separated by gravity. This research deals with the comparison of performance of the pulsed sieve plate extraction column with the mixer-settler and their effect on the column efficiency.

### **Studies in Water Treatment Technologies**

Membrane technique is being used and well commercialized for the removal of fluoride from the ground water. Presently, membrane units are in operation in villages at domestic level, which generates fluoride free water and concentrated fluoride stream. Hence, it is proposed to carry out the comprehensive study on the removal of fluoride from concentrated retentate stream overcoming the drawback of membrane technology. Design of a complete process for purification of drinking water including calcium, magnesium and nitrate will be carried out as well. The various parameters i.e. concentration of lime, concentration of reactants, pH and contamination and effect of other ions present in feed which influences this separation are in progress. Based on optimized

parameters of membrane filtration and precipitation techniques, a process will be designed which will also be tested by experimentation. The experimental data obtained after above mentioned experimentation will be analyzed on Ion Selective Meter and Particle Size Analyzer to develop a complete process for water treatment.

### **Studies in production and purification of a proteolytic enzyme**

Among the treatments of cardiovascular diseases, fibrinolytic agent is promising and highly effective therapy. In this proposed work, main emphasize is given to the production and purification of fibrinolytic enzyme from the bacterial culture. One factor at a time method was employed in the production of enzyme in submerged fermentation. In Bioreactor scale, effect of different operating parameters will be evaluated on the production of enzyme. Different purification technique will be used to achieve higher purity product in minimum time period and with less number of steps. Finally, molecular characterization of enzyme will be carried out to determine its molecular weight and other properties.

### **Hydrodynamics of Extraction Systems**

Optimization of the hydrodynamic characteristics such as drop size, dispersed phase hold-up, flooding and axial dispersion in pulsed

sieve plate column for water-kerosene system has been done with 0.76m diameter and 1m long pulsed sieve plate column. The optimized geometrical parameters are perforation diameter of 0.003m, plate spacing of 0.05m and fractional free area of 0.2. The optimized operating parameters are throughput of 0.013m/s at phase ratio (A/O) of 1:1 and pulsed velocity of 0.025m/s. At the optimized geometrical and operating parameters, Sauter mean Diameter ( $d_{32}$ ) attained was 0.0013m, dispersed phase hold-up ( $\phi$ ) obtained was 0.18 with throughput ( $V_{cf} + V_{df}$ ) of 0.013m/s. Continuous phase axial dispersion coefficient (E) was  $6.56 \times 10^{-4}$  m<sup>2</sup>/s. The design of pulsed sieve plate column in terms of diameter and height has been done. The equilibrium data is generated for 0.3M HNO<sub>3</sub>-TBP-dodecane system and the mass transfer study have been conducted for the removal of dissolved TBP from aqueous 0.3M HNO<sub>3</sub> stream. NTU required was 1.52 and the HTU of 0.63 for optimized flow rate and other geometrical and operating conditions was calculated from the experimental results. For removal of dissolved TBP from 202ppm to 5ppm, the NTU required was 3.7 and HTU was constant i.e.0.63m at constant set of geometrical as well as operating conditions. Thus the desired height of the column would be 2.3m. From experimental throughput data, the column diameter required for 100 kg/hr of 0.3M HNO<sub>3</sub> feed was 0.085m.

### Studies in liquid-liquid systems

Tri n-butyl phosphate (TBP) is the most frequently used solvent in liquid – liquid extraction for nuclear fuel reprocessing. But contact between TBP and aqueous solutions of nitric acid and/or heavy metal nitrates salts at elevated temperature can lead to violent reactions. Thus, there is a need for making development in solvent extraction process for removal of TBP from aqueous waste, so that it can be easily disposed off without creating any explosion havoc. The proposed research work involves studying the solubility of TBP in different concentrations of nitric acid under different conditions. The generation of equilibrium data for different concentrations of TBP and nitric acid will be helpful in calculating the number of theoretical stages in designing of the extraction column. This will be useful for maximum removal of TBP from the aqueous waste. Extraction of dissolved TBP in acidic aqueous solution was done by Normal Paraffin Hydrocarbon (NPH) solvent using air ejector mixer-settler. Analysis of very low level TBP in both organic and aqueous phase was done. TBP dissolved in organic media like dodecane and NPH was analyzed on Gas Chromatograph (GC) while that dissolved in aqueous media was analyzed on High Performance Liquid Chromatograph (HPLC). Physical properties like viscosity, density and interfacial tension of TBP-NPH-Nitric acid system were also studied.

### DR. P. R. GOGATE

Improved synthesis of Iron doped TiO<sub>2</sub> has been attempted based on the use of ultrasound during the sol-gel process and optimizing the important parameters to obtain the best catalyst with minimum particle size. The best catalyst obtained was with a minimum particle size of 99 nm under conditions of 0.4 mol% doping of iron, 60 min treatment of ultrasound, initial temperature of 30°C, propan-2-ol as the solvent and solvent to precursor ratio as 10. The particle size of the catalyst obtained through conventional approach under otherwise similar conditions has been found to be 325 nm. Various characterization techniques like DLS, Surface BET analysis, SEM, EDS, XRD and UV-Vis band gap analysis have been used for establishing the superior characteristics of the obtained catalyst. The subsequent application of the obtained best catalyst was also investigated in the photocatalytic degradation of Acid Blue 80 dye (fixed initial concentration as 10 ppm). The effect of various parameters like catalyst loading and UV power as well as intensification of degradation based on the addition of H<sub>2</sub>O<sub>2</sub>, ozone, Potassium persulfate (KPS) as process intensifying additives has been studied. Overall it was established that at an optimum catalyst loading of 0.2 g/L, 16 W of UV power and 0.4 g/L KPS loading, maximum degradation of 99.59 % was obtained in 120 min of irradiation also giving a COD reduction of 95%. Integral method of analysis for

kinetics revealed that pseudo-first order kinetics explained the degradation very well. Comparative study of the different catalysts established that iron doped TiO<sub>2</sub> catalyst synthesized using ultrasound assisted approach gave the higher efficacy as compared to the iron doped TiO<sub>2</sub> catalyst synthesized using the conventional approach and undoped TiO<sub>2</sub>.

Use of different cavitation reactors, namely, ultrasonic bath, ultrasonic flow cell, high speed homogenizer and hydrodynamic cavitation using orifice plate, circular venturi and slit venturi was investigated for obtaining stable emulsion of turmeric oil in skimmed milk. The effect of different operating parameters on the droplet size and stability has been investigated. The oil droplet size decreased from 282.5 nm to 239.3 nm with an increase in power amplitude from 20% to 80% in the ultrasonic flow cell whereas, in the case of hydrodynamic cavitation using orifice plate, an increase in pressure from 5 to 10 bar led to a decrease from 338.6 to 235.0 nm. In high speed homogenizer, the oil droplet size increased from 231.3 to 313.7 nm with an increase in input voltage from 100 to 140 V. The ability of these six emulsification devices to generate emulsions at large scale was assessed with an objective to compare efficiency of different reactors based on energy density. To produce stable emulsion, the energy requirement of ultrasonic bath (98.28 J/mL) was observed to be

far lower than that of ultrasonic flow cell (461.4 J/mL) and hydrodynamic cavitation with orifice plate (1008.00 J/mL), circular venturi (756.00 J/mL) and slit venturi (1008.00 J/mL). Also, in the case of emulsification using ultrasonic bath, the effectiveness of treatment approach was analyzed for the use of ultrasound and stirring in different combinations. The obtained results clearly established that ultrasonic bath reactor operated in combination with stirrer produced stable emulsion with minimum droplet size (232.2 nm) and 0.12 PDI value at lowest energy consumption.

Value addition of lactose to hydrolyzed lactose syrup containing glucose and galactose in major proportion was investigated using the novel approach of ultrasound assisted acid catalyzed lactose hydrolysis. The hydrolysis of lactose was performed in ultrasonic bath (33 kHz) at 50% duty cycle at different temperatures as 65°C and 70°C with hydrochloric acid (HCl) concentration also varied as 2.5 N and 3 N. It was observed that acid concentration, temperature and ultrasonic treatment were the major factors in deciding the time required to complete ~90% hydrolysis reaction. The ultrasonic assisted approach resulted in reduction of reaction time depending on the temperature, acid concentration and time of ultrasonic exposure. It was observed that the maximum process intensification obtained by introduction of ultrasound

in the lactose hydrolysis process for ~90% hydrolysis with 70°C and 3N HCl was reduction in the required time from 4 hours (without the presence of ultrasound) to 3 hours. The scale-up study was also performed using an ultrasonic bath with longitudinal horn (36 kHz as operating frequency) at 50% duty cycle with the optimized temperature of 70°C and acid concentration of 3 N. It was observed that the reaction preceded faster using ultrasonic assistance in the presence of stirring by axial impeller at rpm of 225±25. The time required to complete ~90% of reaction and the extent of hydrolysis remained almost the same as observed for small scale study on ultrasonic bath (33 kHz) at 50% duty cycle. Overall the work has presented a novel ultrasound assisted approach for intensified lactose hydrolysis.

A novel biosorbent synthesized from *Ficus racemosa* leaves based on the treatment using NaOH was applied for removal of Acid Blue 25 from aqueous solution. The synthesized biosorbent was characterized using scanning electron microscopy, Fourier transform infrared spectroscopy and Brunauer-Emmett-Teller analysis. NaOH treatment was demonstrated to remove lignin content from the biomass as well as induce the development of significant pores. Batch experiments were performed to evaluate the effect of important operating parameters such as pH (range of 2-10), biosorbent dose (range of 1-10 g/L), contact time (range of 0-5 h), initial dye



concentration (range of 50-400 mg/L) and temperature (range of 293-323 K) on the extent of removal of Acid Blue 25. The established optimum conditions were pH of 2, biosorbent dose of 4 g/L, contact time of 3 h and temperature of 323 K yielding maximum removal of dye. Pseudo-second order model was found to best fit the kinetic data. Langmuir and Temkin isotherm models were found to best fit the equilibrium data. The obtained thermodynamic parameters confirmed endothermic and spontaneous nature of adsorption. The study established the utility of novel biosorbent for removal of Acid Blue 25 dye with higher adsorption capacities (83.33 mg/g) as compared to the more commonly used adsorbents. Desorption studies conducted for seven cycles indicated potential reusability of synthesized biosorbent for the treatment of textile dye effluents.

Biodiesel offers as an excellent alternative to the petro-based diesel fuel and can be derived from the reaction of vegetable/non-edible oils and/or animal fats with alcohols using the transesterification reaction. In the present study, hydrodynamic cavitation device as High Speed Homogenizer has been used for the intensified production of biodiesel for the first time. The efficacy of biodiesel production was observed to be dependent on the operational parameters viz. molar ratio, catalyst loading and operating temperature. The maximum yield of biodiesel obtained in the present work

was 97% for waste cooking oil as starting material and 92.3% for fresh cooking oil under optimized conditions of reaction time of 120 min, molar ratio of methanol to oil as 12:1, 3% wt loading of KOH and temperature of 50°C. The study demonstrated that the application of cavitation offers the advantages as enhanced progress of reaction in reduced reaction time and improved separation. Overall, high speed homogenizer has been established to be a viable approach for intensified biodiesel production with possibly favourable economics.

Ultrasound assisted intensification of synthesis of tricapyrylin based on the enzyme catalyzed reaction of caprylic acid and glycerol was investigated with a novel approach of using ultrasound in only the initial stages of the reaction. Two types of immobilized lipases as Lipozyme RM (Rhizomucor Miehie) and Novozym 435 (Candida Antarctica) have been used in the work. The effect of ultrasonic conditions as treatment time and power as well as the reaction conditions as substrate molar ratio, reaction time and enzyme loading on the extent of yield of tricapyrylin has been investigated. It was established that the optimum pretreatment conditions were irradiation time as 30 min with ultrasonic frequency of 20 kHz, supplied power of 240 W, 70% duty cycle (7 s on 3 s off cycle) whereas the optimum reaction conditions were 4:1 molar ratio of caprylic acid to

glycerol, enzyme loading as 3% and operating temperature of 50 °C. It was also established that reuse of enzymes for 10 cycles was possible without any significant effect on the activity of lipase. It was also conclusively established that compared to the conventional approach of synthesis, ultrasound pretreatment based approach greatly influenced the rate of reaction and maximum tricapyrylin yield of 94.8% was achieved in 7 h of reaction time under the optimum conditions.

Curcumin, a dietary phytochemical, was extracted from rhizomes of Curcuma amada using ultrasound assisted extraction (UAE) with comparison of the results with the conventional extraction approach to establish the process intensification benefits. The effect of different operating parameters such as type of solvent, extraction time, extraction temperature, solid to solvent ratio, particle size and ultrasonic power on the extraction yield have been investigated in details for UAE. The maximum extraction was obtained at optimized conditions of 35 °C temperature, solid to solvent ratio of 1:25, particle size of 0.09 mm, ultrasonic power of 250 W and ultrasound frequency of 22 kHz with ethanol as the solvent. Soxhlet extraction was used for establishing the curcumin content in the plant material and the results of extraction yield were expressed as a function of this maximum content. Under optimized conditions, the extent

of curcumin extraction using UAE was 72% achieved in 1 h at 35 °C temperature, which was higher as compared to the batch extraction (about 62% in 8 h of treatment). Peleg's model was used to describe the kinetics of UAE and the model showed a good agreement with the experimental results. Overall, ultrasound has been established to be a good process intensification approach for extraction of curcumin with benefits of reduction in time as compared to batch extraction or operating temperature as compared to Soxhlet extraction, which can give economical benefits and also lead to greener processing.

### **MRS. K. V. MARATHE**

Participation in New INDIGO NPP2 Project – Greentech

Talks delivered during the Co-Operation Days:

Technologies in Water Treatment (University of Cantabria, Spain)

Water treatment Management (University of Oulu, Finland)

Completion of Research Project as Principal Investigator sponsored by Department of Science and Technology - DST, India

Completion of Research Project as Principal Investigator sponsored by All India Council for Technical Education - AICTE, India

### **DR. V. H. DALVI**

My work is primarily focused towards using principles of physics and engineering to quantitatively develop and evaluate potential of technologies of interest to the Indian public. Some initial successes have been the discovery that solar thermal technologies can eventually displace coal firing from Rankine cycle power plants. In a parallel endeavour, we have been able to work with mechanical engineers to bring down the cost of solar-thermal collector by a factor of 4. We have simultaneously developed a protocol to use powerful, open source, data analysis platform for rapid process simulations: using which we were able to find a synergy between gas-power cycles and heat-treatment of waste aqueous streams. Several of these discoveries have been published in high impact journals or have patents filed. Our current focus is on developing a “Green Steam” cascade where solar thermal steam provides the core of a small semi-rural industrial estate.

Our group also has a theory section that works on molecular simulations of confined surfaces (in collaboration with experimentalists in King Abdullah University of Science and Technology, Saudi Arabia) and we are trying to use concepts of statistical mechanics to extract maximum utility out of the Cubic Equation of State framework.

### **PROF. P. K. GHOSH**

Several pieces of work initiated while at CSIR-CSMCRI were successfully completed and published.

A project was initiated to detect presence, if any, of fluoride, uranium and arsenic in commercial phosphate fertilizers. Analysis by highly competent bodies indicate high levels of the above contaminants. A manuscript is in preparation.

The hydrostatic pressure head was substituted with pneumatic pressure head to effect efficient water purification through ultrafiltration membrane.

It has been shown that the rinse water from washing machine can be suitably recycled.

## Photo

Prof. B.N. Thorat



**L-R:** Rahul Shete, Tejesh Patil, Dr. Sachin Jadhav, Nupur Nagwekar, Shilpa Haramkar, Pankaj Sinhmar, Rasika Hangekar, Prof. B. N. Thorat, Priyanka Jadhav, Aditya Deshmukh, Arvind Sikarwar, Aditya Kamble, Amit Kamble, Anand Chavan, Govind Thombare.

Prof. Sunil S. Bhagwat



**First Row (from bottom):** Pallavi (Ph.D. (Sci.)), Manisha(Ph.D.(Sci.)), Rajsee (M.Tech.), Shobha(Ph.D. (Sci.))  
**Second row:** Prashant(Ph.D. (Sci.)), Kalpana(Ph.D. (Tech.)), Vaibhav(Ph.D. (Sci.))  
**Third row:** Sudarshan(Ph.D. (Tech.)), Akshaya(Ph.D. (Tech.)), Dhruv(M. Chem. Engg.), Kunal(Ph.D. (Sci.))  
**Fourth row:** Farhan (M. Chem. Engg.), Mayur(M.Tech.), Rahul (Ph.D. (Tech.))  
**Fifth row:** Swapnil(Ph.D. (Tech.)), Abhishek(M.Tech.)



Prof. V. G. Gaikar



**Left to Right:** Shrilekha Sa want, Vijayalakshmi, Mufeedah Muringa Kandy, Rutuja Bhoje, Tasneem Dabir, Suwarna Hiware, Noopur Rathi, Meena Singh, Suchita Gabhane, Ketan Kabade, Arif Pathan, Angad Barkule, Vishal Sawant, Yogeshwar Dubashae, Vikram Chatake, Syed Tanveer, Aditya Koli

Prof. A.M. Lali



Prof. A.M. Lali in the center with his faculties, staff and students



## Prof. A.B. Pandit



Prof. A. B.Pandit, Amruta Badnore, Karuna Nagula, Mayur Ladole Abha Sahu, Atul bari, Bhagwat Patil, Shankar Kausley, Nilesh Jadhav, Mandar Badve, Ketan Desai, Sarjerao Doltade, Shruti Hingel, Prachi Dwimuthe, Rutuja Kamble, Sagar Shah, Chandrakant Bhogale, Subash G. Priyanka Patil, Gaurav Dastane, Chandrakant Holkar, Aanada Jadhao, Akshay Narkhede and Zakir Hussain.

## Prof.A.V. Patwardhan



(1st row, L to R): Machhindra Bhalerao (PhD Chemistry), Shankesh Ekhande (M Chem Eng), Yogesh Choughule (PhD Chemistry), Swapnil Chaudhari (PhD Tech Chem Eng), Swapnil Rajput (PhD Tech Chem Eng), Nitin Thombre (PhD Tech Chem Eng)

(2nd row, L to R): Saurabh Mulay (M Chem Eng), Shweta Kumbhraj (PhD Chemistry), Anand V. Patwardhan, Radhish Gupta (M Chem Eng), Ketan Kulkarni (PhD Chemistry)

(3rd row, L to R): Vaishali Kulkarni (PhD Tech BPT), Vandana Prabhu (PhD Tech Chem Eng), Geetanjali Ratrey (M Chem Eng)

## Prof. A.W. Patwardhan



**Left to Right :** Raosaheb Farakte (Ph.D), Dhiraj Lote (Ph.D.), Shashank Tiwari (Ph.D.), Nilesh Hendre (Ph.D), Amol Ganjare (Ph.D), Manish Yadav (Ph.D), Manjurul Hoque (Intern), Pratiksha Biranje (Ph.D), Aadil Bharucha (M. Chem. Eng.), Prof. Ashwin Patwardhan, Sudha Ramani (M. Chem. Eng.), Pallavi Dhekne (Ph.D), Shrilekha Sawant (Ph.D), Geeta Yadav (Ph.D), Durgesh jha (Ph.D), Shruti Hinge (Ph.D), Chaitanya Mali (Ph.D), Vaishali V. (M.Chem. Eng.), Deepak Bapat (Ph.D).

## Dr. V. K. Rathod



Left to Right:

First row- Priyanka Rao, Girish Nivehekar, Prof. VK Rathod, Dhairyasheel Santre, Suraj Yadav

Second Row- Kajal Jaiswal, Sneha Bansode, Prerana Tomke, Kavita L, Swetha Pawar, Neha Gharat, Revati Chauhan, Komal M

Third Row- Manjeshwari Sonar, Prachi Sadawarte, Ketan Ingle

Last Row- Manish Salgaongar, Rahul Walwatkar, Govind Waghmare, Shyamraja Nadar



Dr. P. R. Gogate



First row (From Left to Right): Amrutlal Prajapat (Ph. D.), Ankit Sharma (MChem), Mihir Panda (R.A.), Saurabh Joshi (Ph. D.), Nishant More (Ph. D.), Santosh Kasar (M. Tech Green tech.)

Second row (From Left to Right): Arati Barik (Ph. D.), Rajeshree Khaire (Ph. D.), Dr. Parag Gogate (Associate Professor), Rajashree Jawale (Ph. D.), Pooja Thanekar (Ph. D.)

Third row (From Left to Right): Rucha Patil (M. Tech. BPT), Monika Diwathe (M. Tech. Green Tech.), Rakhi Vishwakarma (R.A.), Leena Patil (MChem), Rohini Ambati (MChem), Tejaswini Prabhuzantye (M. Tech. BPT).

Mrs. K. V. Marathe



Photograph of Research Scholars from KVM lab. Starting from Left; Mr. Karan Chavan, Pranav Nakhate, Hrishikesh Patil, Shruti Singh, Akshay Hatewar and at the centre, Mrs. K. V. Marathe



Dr. P. D. Vaidya



**From Left (Front Row):** Ganesh Bhoite, Prashanth Chinthapandu, Karan Dewoolkar, Aditti Barge, Nikhita Kumbhare, Swati Sakhare, Swapnil Ghungrud, Makrand Belsare, **From Left (Back Row):** Shrikant Vemula, Sachin Bhandare, Dr. P. D. Vaidya, Dipak Payal, Shailesh Patil, Ashvin Karemore, pravin Suryawanshi

Dr. V. H. Dalvi



**Left to Right :** Tukaram Shinde, Dr. V.H. Dalvi, Rinin Rajan, Sanket Chafle.

Dr. R.D. Jain



**Left to Right :** Akshay Holkar, Nanda Rohra, Madhura Londhe, Medhna Suvarna, Ashu Deokuliar, Dr. Ratnesh Jain, Sharwari Ghodke, Tejal Pant, Anomitra Dey, Harshal Guodmare.

**2nd Row Left to Right :** Anurag Dobhal, Mahesh More, Saurabh Patil, Akhil Krishnan and Mahesh Tambe.

Dr. C. S. Mathpati



**Front Row: (L to R):** Naresh Hanchate, Bhavesh Gajbhiye, Dr. C. S. Mathpati, Aniket Waval, Prachi Dwidmuthe, Pratiksha Karmankar,

**Back Row (L to R):** Gulshan Maheshwari, Harshawardhan Kulkarni, Parikshit Shahane, Niraj Kulkarni



Dr. P. R. Nemade



**From left to right :** Priyanka Sane, Jyoti Ambre, Sushil Chaudhari, Rasika Mhetre, Sanjeevani Umale, Pramod Gawal, Amar Dhopte, Dr. P. R. Nemade, Aniket Waval, Kiran Dhopte, Rahul Zambare, Pratiksha Pawar.

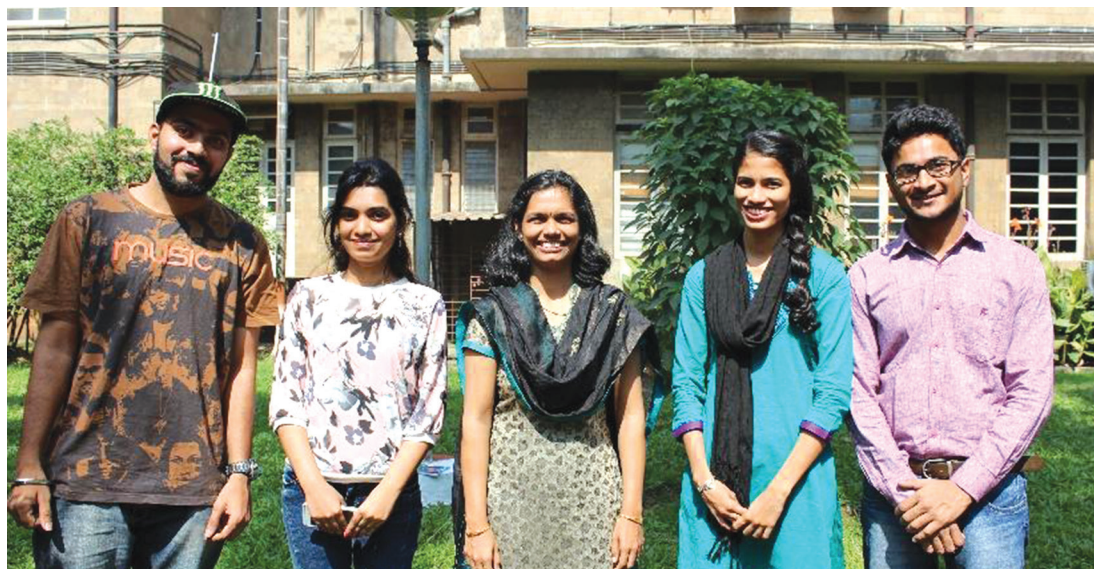
Dr. D.V. Pinjari



**Left to Right :** Nilesh Jadhav, Chandrakant Holkar, Anand Jadhav, Sammit Karekar, Dr. Dipak Pinjari, Ketan Kabade, Pranit Patil, Aditya Deshpande, Sharvari Desai.



Dr. J. Sontakke-Gokhale



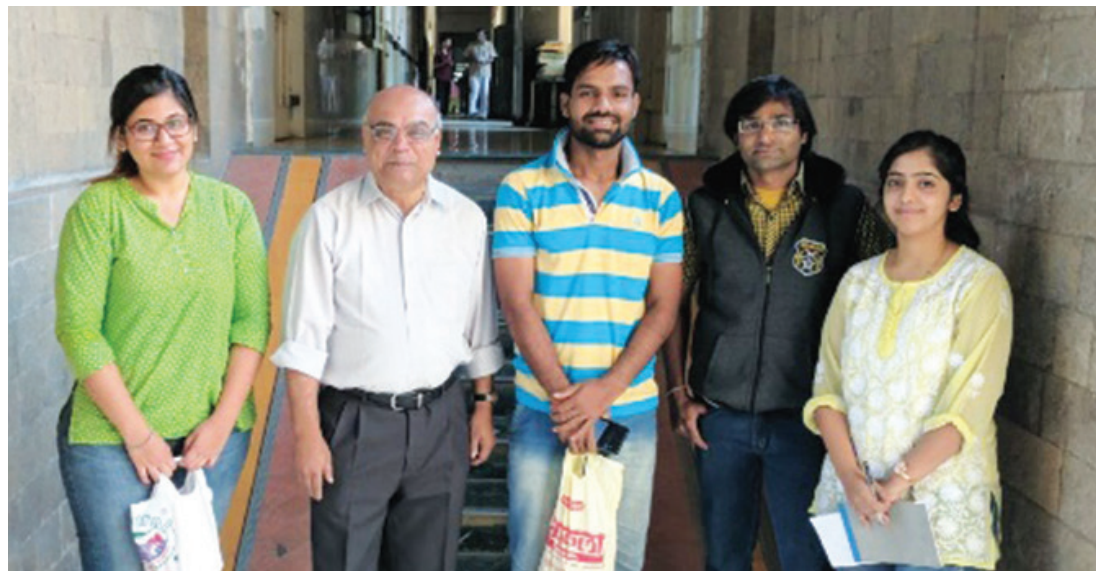
Left to Right : Nitin Sangle, Vasudha Borkar, Jyoti Gokhale, Ankita Gawas and Dipanshu Garg

Dr. S. M. SONTAKKE



From L to R: Prashant, Vedraj, Swapnil, Dr. Sontakke, Priyanka, Sneha Tambat, Sanjivani

Prof. P. K. Ghosh



**From left to right :** Rhea Bhansali, Prof Pushpito K. Ghosh, Bharat Honmane, Dr. Lokesh Ramteke, Neha Bagwe

Prof. L. K. Mannepalli



**Left to Right :** From Left- Gunjan Deshmukh, Dr. Akhil Nakhate, Prof. M. Lakshmi Kantam, Dr. Chandrakanth Gadipelly, Kalidas Rasal, Shyam Sunder Gupta