Chemical Engineering

ANNUAL REPORT 2008-2009
(April 1, 2008 – March 31, 2009)

The Department of Chemical Engineering has a strong focus on excellence in education and research. The Department has a dynamic faculty with a wide range of research specializations. Research activities in the Department are supported by excellent research students (Ph.D., M.Tech. and Dual Degree), very competent technical staff, and good experimental and computational facilities.

The recruitment of students into the Ph.D. programme continues to show an uptrend and has contributed to the increase in research activity in the Department. The Department also received good funding for sponsored projects this year. This was reflected in increased numbers of International journal publication numbering hundred, which is significantly higher from the previous years of 71. This is equivalent to about 3 numbers of papers per faculty in a year.

The Department-Industry interactions were multifold this year including continuing education courses (both open and in-house programmes), consultancy, and technology transfer. The Manudhane Excellence Awards are now in their fifth year.

The activities and achievements of the Department for the year 2008-2009 are given in the following sections.

Academic Programmes

Degrees Awarded

B.Tech.   : 74

Dual Degree   : 21

(B.Tech., M.Tech.)   : 95

M.Tech.   : 26

Ph.D.   : 25

R&D activities

The department is involved in a variety of frontier and traditional areas in chemical engineering research, under the broad areas of:
Biological Systems Engineering
Energy & Environment
Materials Engineering
Process Systems Engineering
Reactor Engineering
Transport Phenomena and Complex Fluids
The department received grants from various sources towards many new projects during the year apart from various ongoing projects.

The Department received grants from various sources towards many new projects during the year apart from various ongoing projects. The summary of which is as follows:

Sponsored Research Projects	71
Sponsored Projects	16 (New Projects)
Sanctioned Amount	Rs. 3,81,75,414 Lakhs
Completed Projects	16
Faculty involved	29

The details of these projects is given in the following table

Project Title	Agency Name	Project Status
Reverse Osmosis Thin Film Composite Membranes: Investigations into structure, property and function	DOW Chemical International Pvt. Ltd.	Ongoing
"Synthetic biology of cyanobacteria for solar ethanol"	Indo-French Centre for The Promotion of Advanced Research	Ongoing
"Development of Incremental Machine Direction Stretching Process for Manufacture of Fluoro Polymer Films"	Bhabha Atomic Research Centre	Ongoing
"Aerosol Routes for the Synthesis of Nanoparticles with Controlled Structural Properties: Application to Biodegradable Particles for Drug Delivery"	DST	ongoing
"General Strategies for Nanoparticles of Controlled Size, Shape and Composition: Magnetite as a Case Study for MRI Applications"	DST	Ongoing
"Segregation and packing of granular mixtures during burden distribution"	TATA Steel Ltd., Jameshedpur	ongoing

"Multi-scale simulation of III-V Compound Semiconductors alloys"	DST	Ongoing
"Intracellular changes occurring during adaptation of Mammalian cells to suspension culture"	DST	Ongoing
"Nucleation during granulation with viscous liquid binders under controlled shear flow"	Procter & gamble technology (Beijing) Co. Ltd., China	Ongoing
"Process and Catalyst development studies for synthesis of biodiesel"	TCE Consulting Engineers Ltd., Mumbai	Ongoing
"Experimental and Numerical Investigation of Oil Recovery from Fractured Reservoirs"	Oil & Natural Gas Commission, Ahmedabad	Ongoing
"DuPont young professor award"	DuPont	Ongoing
"Review Meeting - Chemical Engineering on 24-25, 2008 at IIT, Bombay"	Department of Science & Technology	Closed
"Synthesis and use of Ferrofluids for the intensification of Gas-Liquid Mass Transfer processes"	Newreka Green-Synth technologies Pvt. Ltd. Mumbai	Ongoing
"Inter Facial Processes Controlling Lead Mobility In Environmental Systems"	McDonnell academy, st. Louis, USA.	Ongoing
"National Faculty Development Centre (NCP Scheme)"	AICTE, Delhi	Ongoing
"Electrification of Village Kolha using Straight Vegetable Oil and Bio-gas"	Donation	Ongoing

Consultancy projects:

The department undertook 29 jobs generating Rs. 2,56,32,839 /-. The total number of faculty involved 12.

Extension activities:

CEP courses:
Convener: Prof. Mamata Mukhopadhyay
   Title: Extraction and Processing with Supercritical Fluids
Convener: Prof. Moharir Arun Sadashiv
   Title: Piping Engineering
Convener: P Sunthar
   Title: CFD analysis in Chemical Engg.
Convener: Prof. Malik Ranjan Kumar
   Title: Thermodynamic packages in simulation

Convener: Prof. Moharir Arun Sadashiv
  Title: Piping Engineering
Convener: Prof. Moharir Arun Sadashiv
  Title: Piping Engineering
Convener: Prof. Sandip Roy
  Title: Advance Pipeline Technology
Convener: Prof. Malik Ranjan Kumar, Prof. Anurag Mehra, Prof. A.K. Suresh
  Title: Modeling, Analysis and Optimization of Industrial Processes
Convener: Invited speakers
  Title: Modeling, Analysis and Optimization of Industrial Processes
Convener: Prof. Arun Sadashiv Moharir
  Title: Piping Engineering
Convener: Anurag Mehra and Rochish Thaokar
  Title: Synthesis, Characterization and applications of Nanoparticles

Symposium

Research Scholars' Symposium 2009

Seminars:

Convener: Prof. P.W. Wangikar

  Arvind Varma R.
  "New Methods for Hydrogen Generation from Boron Compounds and Waterproof. George Stephanopoulos" January 6, 2009
  Prof. George Stephanopoulos
  "Nanoscale Process Systems Engineering: Towards Molecular Factories, Synthetic Cells, and Adaptive Devices", February 10, 2009
  Mugdha Gadgil
  "A population proportion approach for ranking differentially expressed genes" March 19, 2009
  Prof. Gandhi
  "Modeling of freezing phenomena induced by chemical reactions" March 12, 2009
  Dr. Sachin Jain
  "Nano-scale events with macroscopic effects in PP/silica nanocomposites" 5 March, 2009
  Prof Macosko
  "Polymer Protected Nanoparticles for Drug Delivery" February 27, 2009
  Prof Mackley
  "The processing and application of novel plastic microcapillary films" February 27, 2009
  Anand Tiwari
  December 30, 2008
  Kirti Chandra Sahu
  "Numerical simulations of miscible channel flow with viscosity and density stratifications", January 30, 2009
  Prof. Alon McCormick
  "Observing and understanding nanostructure formation" March 26, 2009

Visitors to the Department:
Prof. Arvind Varma
  Distinguished Professor and Head School of Chemical Engineering,

Purdue University, West Lafayette, IN 47907, USA January 6, 2009

Prof. George Stephanopoulos

Department of Chemical Engineering
Massachusetts Institute of Technology
Cambridge, MA. 02139
Feb. 10, 2009

Prof. Chris Macosko

Professor of Chemical Engineering and Materials Science and Director of IPRIME
the Industrial Partnership for Research in Interfacial and Materials Engineering at the
University of Minnesota

Prof. K. S. Gandhi

Department of Chemical Engineering
Indian Institute of Science
Bangalore

Prof. Alon McCormick,

Department of Chemical Engineering and Materials Science,University of Minnesota,
Minneapolis, USA

Prof. Malcolm Mackley,

Department of Chemical Engineering and Biotechnology, University of Cambridge
Title of Seminar/Conference:
The processing and application of novel plastic microcapillary films

Conferences /Symposia/Workshops and Seminars (participated):

Pramod Wangikar

- Indo American Frontiers of Engineering Symposium, Irvine CA, USA
- ESF-EMBO Symposium on "Molecular Bioenergetics of Cyanobacteria: Towards Systems Biology Level of Understanding", Sant Feliu de Guixols (Costa Brava), Spain

Mahesh S Tirumkudulu

- ICTAM-2008, Adelaide, Australia
- Symposium on Chemotaxis by American Mathematical Society, Univ. of Minnesota, USA

Rochish M Thaokar

- International congress of Rheology, Monterey, California, US
- Unilever symposium on multiscale modeling of complex fluids

Sameer Jadhav

- DBT Young Investigators Meet, February 24th-28th 2009 at Estuary Island, Kerala

Preeti Aghalayam

- "Compartment modelling for Underground Coal Gasification," International Pittsburgh Coal Conference, Pittsburgh, PA, Oct 2008
- "Pyrolysis of sawdust-lignite blends," International Pittsburgh Coal Conference, Pittsburgh, PA, Oct 2008

Sharad Bhartiya

- "An engineering analysis of biological regulatory systems", Advances in Instrumentation, Signal Processing, and Communications, AISPC-09, NDMVP Samaj's College of Engineering, Nashik, January 23-24, (2009),

- "Modeling, Identification and Control of Hybrid Systems", Trends in Industrial Measurements and Automation TIMA 2009, Anna University, Chennai, January 04-06, (2009), (Keynote Address)
- "Modeling and Online Inferential Estimation of Kappa Number for Wheat Straw Pulping in a Pandia Digester", PaperTech India 2008, Mumbai, India, Sept 18-21, (2008).

A.K. Suresh
- Attended and presented two papers in CHISA-08, 18th International Congress of Chemical and Process Engineering, Prague, The Czech Republic, 24-28 Aug 2008.

Sanjay. M. Mahajani
- Indo-German Workshop on Advances in Reaction and Separation Processes, IIT-Madras, February 2008

Mahesh T and K. V. Venkatesh
- Escherichia coli chemotaxsis across glucose gradient, Workshop on cell migration and Chemotaxsis, Institute of Mathematical Applications, University of Minnesota, May 27-30, 2008.

S. C. Patwardhan
- "Constrained State Estimation Using the Ensemble Kalman Filter", Proc. of the 2008 American Control Conference, Seattle, June 2008. 5
- On-line Sensor Fault Identification in an Autonomous Hybrid System using Likelihood Ratio Approach. Proc. of Int. Symposium on Advanced Control of Industrial Processes (AdCONIP'08), Jasper, Canada, May 4-6, 2008. (SCP)
- Development of Control Relevant Reparameterized ARX Models for a Packed Bed Distillation Column. Proc. of Int. Symposium on Advanced Control of Industrial Processes (AdCONIP'08), Jasper, Canada, May 4-6, 2008. (SCP)

S. C. Patwardhan, R. D. Gudi
- Quantifying the Impact of Model-Plant Mismatch on Controller Performance: A non-invasive approach. Proc. of Int. Symposium on Advanced Control of Industrial Processes (AdCONIP'08), Jasper, Canada, May 4-6, 2008. (SCP)

Chandra Ventakraman
- The relative influence of local and long-range transported emissions on aerosols in the Indian region, The International Geosphere Biosphere Programme Congress, Cape Town, South Africa, May 5-9, 2008 (Poster Presentation)
- "Toxicity Characterization of Hydrophobic Organic Compound Mixtures Based on Concentration Addition and Independent Action Models" 5th SETAC World Congress, Sydney, Australia, organized by The Society for Toxicology and Chemistry, Aug 3-7, 2008, (Platform Presentation).
- Statistical Tools for Studying Component Effect and Interactions in Chemical Mixtures. Society for Risk Analyst (SRA), Annual Meeting, Boston, USA, 7th -10th Dec, 2008 (Platform Presentation).
- 2nd International Conference on Energy and Environment, The MacDonnell Academy for Global Energy and Environmental Partnership (MAGEEP), Hong Kong, December 8-11, 2008.

Invited Lectures:

Invited Lectures: National

Gupta, S. K.

- "Multi-Objective GA and its Applications in Polymers", Indo-US Workshop on 'Materials Design: Measurement, Modeling and Informatics,' BEC, Shibpur, Kolkata, 5 – 7 January, 2009.

- "Multi-Objective Optimization: Bio-mimetic Adaptations of Genetic Algorithm", Advances in Chemical Engineering, AChemE, 2009, Thapar University, Patiala, 27 – 28 Feb 2009.

- "Incipient Stable Bubble Formation during Bulk Polymerization of Methyl Methacrylate under Near-Isothermal Conditions", Polymer Processing Society Meeting, PPS-25, Goa, 1 – 5 Mar 2009.

- "Biomimetic Adaptation of NSGA-II-aJG using the Biogenetic Law of Embryology for Multi-objective Optimization", Advances in Chemical Engineering and Process Technology (ACEPT), National Chemical Laboratory, Pune, 4 – 6 June 2009.

Invited Lectures: International

K. V. Venkatesh
- "Systems Biology: A tool for Drug Design", International conference on advances in Therapeutics, Reliance Life Sciences, Feb 2009
- "Characterization of phenotype using elementary modes, International Conference on Integrating physics, chemistry, mathematics and biology to understand living systems" (IPCMB 2008), December 4-7,A symposium celebrating 150 years of the birth of Acharya J.C. Bose and 90 years of Bose Institute, Calcutta, India (2008)
- "Optimization of Bioprocesses using metabolic engineering, Indo-US Conference on Bioprocess & Bio Products Technology Trends & Opportunities", Hyderabad, 27-28 November 2008

S.C. Patwardhan
- "Nonlinear Bayesian State Estimation: A Review and New Results" at Dept. of Chemical Engineering, Carnegie Mellon University on March 27, 09.

Sandip Roy
- "Use of Quantitative Risk Assessment for Insurance Industry", delivered at The New India Assurance Co. Ltd, 16 September 2008.

V. M. Naik
- "Patterns of Creativity in Development of Science and Technology" - 5th July 2008 - IIT Kanpur
- "Multi-scale Material Manipulation through Dielectrophoretic Forces" - International Conference on Multi-scale Structures and Dynamics of Complex Systems organised jointly by INSA, CAS-China, RAE-UK, Uniever - 4th&5th Sept 2008, Bangalore
- "Dr KKG Menon - the Scientist" - AFST and UICT - 19th September 2008, Mumbai

Pramod Wangikar
- Conference on "Synthetic Biology" University Polytechnica Valencia, Valencia, Spain December 2008

Mahesh S Tirumkudulu
- "Stability of a thin radially moving liquid sheet in the presence of acoustic excitation" at ICTAM-2008, Adelaide, Australia

Preeti Aghalayam
- "Underground Coal Gasification: A Clean coal technology for India" at "Coal Gasification: The Path Forward," Mumbai, India, Dec 2008
- "Clean Coal: Future technologies for coal utilization," Indo-American Frontiers of Engineering Symposium, Irvine, CA., Feb 2008

Sharad Bhartiya
- "An engineering analysis of biological regulatory systems", Advances in Instrumentation, Signal Processing, and Communications, AISPC-09, NDMVP Samaj's College of Engineering, Nashik, January 23-24, (2009), (Plenary Address)
- "Modeling, Identification and Control of Hybrid Systems", Trends in Industrial Measurements and Automation TIMA 2009, Anna University, Chennai, January 04-06, (2009), (Keynote Address)

A.K. Suresh
- "Enhancement of Gas–Liquid Mass Transfer Using Ferrofluids – An Experimental Study", talk delivered in the Department of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, USA, June 19, 2008.

Sanjay. M. Mahajani
- Conceptual design for Selectivity Engineering with Reactive Distillation, Indo-German Workshop, IIT-Madras, February 2008
- Scale-up in Pharmaceutical Processes, June 2008, UICT-Mumbai

V Govardhana Rao
- Photochemical Processes for Industrial Waste Treatment – An overview: Invited lecture in National Seminar on Role of Chemistry in monitoring and management of Environment, Organized by Dept. of Chemistry, Sri Venkateswara University, Tirupati, February 16-17, 2009.

P sunthar
- International Congress on Rheology, August 3 to 8, 2008, Monterey California

Significant Awards and Distinctions:

Sandip Roy
- Winner of the PANIIT2008 for best position paper in Competition on "IIT Leadership in Research" on the theme of improving the "Research Ecosystem of the IITs", IIT Madras, 19-21 December 2008.

Jayesh Bellare
- Appointed as "Piercy Distinguished Visiting Professor" at the University of Minnesota, USA
- Elected as Fellow of the Indian National Academy of Engineering

S. C. Patwardhan
- The following paper was winner of the best paper in the session award Prakash, J., S. C. Patwardhan and S. L. Shah "Constrained State Estimation Using the Ensemble Kalman Filter", Proc. of the 2008 American Control Conference, Seattle, June 2008.
- Awarded Indo-US Science and Technology Forum travel grant for working on a collaborative at Carnegie Mellon University.

C. Venkataraman
- H.H. Mathur Award for Research Excellence in Applied Science (2008), distinguished faculty career award, IIT Bombay

P. Sunthar
- Du Pont Young Professor Award, 2008

Preeti Aghalayam
- Amar Dye Chem Award, IIChE, 2008

Sanjay. M. Mahajani
- Excellence in Teaching, IIT Bombay (2008)
  Honorary Work

K. V. Venkatesh
- Associate Editor, BMC Systems Biology.
- Member Editorial Board, International Journal of Systems and Synthetic Biology

V. M. Naik
- Member of the National Scientific Advisory Committee - Ministry of Food Processing Industry, Govt. of India
- Reviewer and member of the Programme Advisory Committee of DST for Chemical Engineering
- Member of the Research Council of CFTRI Mysore
- Reviewer for I&EC Research

Pramod Wangikar
- Member, Editorial Board, Biotechnology and Bioengineering

Ganesh A Viswanathan
- Reviewed papers for Chemical Engineering Journal

Rochish M Thaokar
- Reviewed papers for Physics of Fluids

Anurag Mehra
- Reviewer for Industrial engineering Chemistry, Langmuir
- Member, Department of Science & Technology (DST), Chemical Engineering Programme Advisory Committee (PAC)
- Faculty Selection Committee, Chemical Engineering, IIT Guwahati

Sharad Bhartiya
- Reviewed papers in Journal of Process Control

A. K. Suresh
- Reviewer, AIChE J, J Memb Sci, I&EC Research, Polymer, AIChE J, etc.
- Member, Editorial Advisory Board, Recent Patents on Chemical Engineering, a Benthan Science Publishers Journal

Sanjay. M. Mahajani
- Reviewed papers for I&ECR, Chemical Engg. & Processing: Process Intensification, Chemical Engg. Science, Catalysis Letters

Mani Bhushan
- Reviewed papers for journals such as Automatica and Canadian Journal of Chemical Engineering

Faculty Members and their specializations:

Jhumpa Adhikari
Statistical Thermodynamics, Molecular Simulations
Preeti Aghalayam
Reactor Modelling, Multiphase Reaction, Catalysis, Renewable Resources, Pollution, Coal Gasification
Rajdip Bandyopadhyaya
Porous Media, Colloids, Aerosols, Thin films, Surface Science, Nanoparticles, Nano-composites
Jayesh Bellare
Separations, Surface Science, Nanoparticles, Microscopy, Drug Delivery
Sharad Bhartiya
Process Control, Modelling, Identification
Mani Bhushan
Process Safety Analysis, Process Control, Optimisation, Identification
Ravindra D. Gudi
Process Safety Analysis, Process Control, Optimisation, Identification, Biochemical Engineering
Santosh Kumar Gupta
Reactor Modelling, Process Control, Optimisation
Sameer Jadhav
Surfactants, Computational Flow Modelling (CFD), Drug Delivery, Biomolecular Engineering
Vinay A. Juvekar
Surfactants, Separations, Rheology, Electrohydrodynamics, Multiphase Reaction, Surface Science, Polymer Physics
Devang V. Khakhar
Surfactants, Rheology, Granular Flow, Reactor Modelling, Polymer Processing, Nano-composites, Drug Delivery
Kartic Chandra Khilar
Surfactants, Porous Media, Coatings, Green Engineering
Sanjay. M. Mahajani
Separations, Computational Flow Modelling (CFD), Multiphase Reaction, Catalysis, Renewable Resources, Coal Gasification
Ranjan Kumar Malik

Separations, Modelling, Energy Integration

Anurag Mehra
Surfactants, Multiphase Reaction, Nanoparticles, Molecular Simulations, Food Engineering

Sarika Mehra
Systems Biology, Computational Biology, Biomolecular Engineering

Arun Sadashio Moharir
Separations, Reactor Modelling, Optimisation, Modelling, Pollution

Kannan M. Moudgalya
Process Control, Modelling

Mamata Mukhopadhyay
Separations, Food Engineering

V. M. Naik
Surfactants, Separations, Electrohydrodynamics, Colloids, Surface Science, Nanoparticles, Food Engineering

Hemant Nanavati
Statistical Themodynamics, Polymer Processing, Polymer Physics, Nano-composites, Molecular Simulations, Renewable Resources, Computational Biology

Janaky Narayanan
Surfactants, Rheology, Surface Science, Microscopy

Santosh Noronha
Renewable Resources, Green Engineering, Systems Biology, Computational Biology, Biomolecular Engineering, Biochemical Engineering

Sachin C. Patwardhan
Process Control, Modelling, Identification

V Govardhana Rao
Separations, Rheology, Heat and Mass Transfer

Sandip Roy
Surfactants, Separations, Process Safety Analysis, Surface Science, Statistical Thermodynamics, Renewable Resources

Hariharan S. Shankar
Pollution, Biochemical Engineering

P. Sunthar
Surfactants, Granular Flow, Computational Flow Modelling (CFD), Polymer Physics, Drug Delivery

A. K. Suresh
Heat and Mass Transfer, Multiphase Reaction, Catalysis, Nanoparticles, Biochemical Engineering

Rochish M Thaokar
Surfactants, Electrohydrodynamics, Computational Flow Modelling (CFD), Colloids, Statistical Themodynamics, Nanoparticles, Drug Delivery

Mahesh S Tirumkudulu
Surfactants, Rheology, Computational Flow Modelling (CFD), Colloids, Coatings, Thin films, Surface Science, Drug Delivery

Chandra Venkataraman
Aerosols, Surface Science, Nanoparticles, Nano-composites, Drug Delivery, Renewable Resources, Pollution, Climate Change

K. V. Venkatesh
Food Engineering, Systems Biology, Biomolecular Engineering, Biochemical Engineering

Madhu Vinjamur
Porous Media, Heat and Mass Transfer, Coatings, Food Engineering, Renewable Resources

Ganesh A Viswanathan
Reactor Modelling, Multiphase Reaction, Systems Biology, Computational Biology, Biomolecular Engineering
Pramod Wangikar
Process Control, Modelling, Computational Biology, Biomolecular Engineering, Biochemical Engineering

Publications:

Book authored:

S.K. Gupta
> *Numerical Methods for Engineers,* 2nd Ed., New Delhi: New Age Intl.   Publishers, (2009)

Book chapters:

V. M. Naik
> "Nanophenomena at Work, for Colour Management in Personal Care", *Bionanotechnology: Global Prospects*; Book Edited by D. Reisner, CRC Press - Taylor & Francis Group, (2008)

S. C. Patwardhan
> "Unconstrained NMPC Based on a Class of Weiner Models: A Closed Form Solution", *Nonlinear Model Predictive Control Towards New Challenging Applications Serie*s: *Lecture Notes in Control and Information Sciences,* Vol. 384 (2009)

S. C. Patwardhan
> "State Estimation and Fault Tolerant Nonlinear Predictive Control of an Autonomous Hybrid System Using Unscented Kalman Filter", *Nonlinear Model Predictive Control Towards New Challenging Applications Series: Lecture Notes in Control and Information Sciences* , Vol. 384 (2009)

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Articles in Journals

Articles in Journals (National):

Kotecha P. R.; Bhushan M.; Gudi R. D.
> "Applications of Constraint Programming in Process Systems Engineering", ICEATS, Volume I, Rajkot, Gujarat, p.1094 - 1099, (2008)

Kotecha P. R.; Bhushan M.; Gudi R. D.
> "A Unified Framework for the Design of Reliable and Precision Sensor Networks", *ICEATS*, Volume I, Rajkot, Gujarat, p.274 - 278, (2008)

Kotecha P. R.; Bhushan M.; Gudi R. D.
> "Comparison of Mathematical Programming and Constraint Programming for the Design of Sensor Networks", *ICEATS*, Volume II, Rajkot, Gujarat, p.1495-1500, (2008)

Vinod, P.K.; Venkatesh, K.V. ,
> "Quantification of signaling networks", *Journal of the Indian Institute of Science*, Volume 88, Issue 1, p.1 - 26, (2008)

Das, D.; Dhurjati, P.; Wangikar, P.P.
> "Prediction of pharmacokinetic behaviour by combining in vivo and in vitro data in physiologically based pharmacokinetic (PBPK) model: Parameter estimation and sensitivity analysis", *Journal of the Indian Institute of Science*, Volume 88, Issue 1, p.57 - 71, (2008)

Rao V. Govardhana
> "Code RAMM for rewetting velocity on vertical nuclear fuel clad", *Indian Chemical Engineer*, 50(3), p205-213 (2008).

Articles in journals: International

Ramteke, M.; Gupta, S.K.
> "Biomimetic adaptations of GA and SA for the robust MO optimization of an industrial nylon-6 reactor", *Materials and Manufacturing Processes*, Volume 24, Issue 1, p.38 - 46, (2009)

Thotla, S.; Mahajani, S.M.
> "Conceptual design of reactive distillation for selectivity improvement in multiple reactant systems", *Chemical Engineering Research and Design*, Volume 87, Issue 1, p.61 - 82, (2009)

Deshmukh, K.S.; Gyani, V.C.; Mahajani, S.M.
> "Esterification of butyl cellosolve with acetic acid using ion exchange resin in fixed bed chromatographic reactors", *International Journal of Chemical Reactor Engineering*, Volume 7, (2009)

Mehta, B.; Venkataraman, C.; Bhushan, M.; Tripathi, S.N.
> Identification of sources affecting fog formation using receptor modeling approaches and inventory estimates of sectoral emissions, *Atmospheric Environment,* Volume 43, Issue 6, p.1288 - 1295, (2009)

Chavan, A.R.; Raghunathan, A.; Venkatesh, K.V.
> "Modeling and experimental studies on intermittent starch feeding and citrate addition in simultaneous saccharification and fermentation of starch to flavor compounds", *Journal of Industrial Microbiology and Biotechnology*, p.1 - 11, (2009)

Khandelwal, A.; Singhania, M.; Vinjamur, M.
> Optimization of operating conditions in a single-zone drier for two-layer polymer coatings, *Journal of Applied Polymer Science*, Volume 111, Issue 1, p.308 - 316, (2009)

Padhiyar, N.; Bhartiya, S.
> "Profile control in distributed parameter systems using lexicographic optimization based MPC", *Journal of Process Control*, Volume 19, Issue 1, p.100 - 109, (2009)

Thotla S.; Mahajani S.
> "Reactive distillation with side draw", *Chemical Engineering and Processing: Process Intensification*, Volume 48, Issue 4, p.927 - 937, (2009)

Manuja S.; Narasimhan S.; Patwardhan S.C.
> "Unknown input modeling and robust fault diagnosis using black box observers", *Journal of Process Control,* Volume 19, Issue 1, p.25 - 37, (2009)

GanvirV; Lele AK; Thaokar RM; Gautam BP

"Prediction of extrudate swell in polymer melt extrusion using an Arbitrary Lagrangian Eulerian (ALE) based finite element method", *Journal of Non-Newtonian Fluid Mechanics*, 2009, Volume 156, Issue 1-2, p.7, (2009)

Wagh S.J.; Dhumal S.S.; Suresh A.K.

"An experimental study of polyurea membrane formation by interfacial polycondensation", *Journal of Membrane Science*, Volume 328, Issue 1-2, p.246-256, (2009)

Meenesh R. Singh Sandip Roy Jayesh R. Bellare

"Influence of Cryogenic Grinding on Release of Protein and DNA from Saccharomyces cerevisiae", *International Journal of Food Engineering*, Volume 5, Issue 1, p.25, (2009) Abstract

Janhavi S. Raut; Sathish Akella; AmitKumar Singh; Vijay M. Naik

"Catastrophic Drop Breakup in Electric Field", *Langmuir,* Volume 25 (9), pp 4829–4834 (2009)

Wagh S.J.; Dhumal S.S.; Suresh A.K. ,

"An experimental study of polyurea membrane formation by interfacial polycondensation", *Journal of Membrane Science,* Volume 328, Issues 1-2, pp 246-256 (2009)

Singh KB Bhosale LR and Tirumkudulu MS

"Cracking in Drying Colloidal Films of Flocculated Dispersions", *Langmuir* Volume In Press, (2009)

Sarkar A and Tirumkudulu MS

"Consolidation of Charged Colloids during Drying, Consolidation of Charged Colloids during Drying", *Langmuir* Volume 25 (9), pp 4945–4953 (2009)

Bhowmick T.K.; Suresh A.K.; Kane S.G.; Moudgil B.; Bellare J.R.

"A study of the effect of JB particles on Saccharomyces cerevisiae (yeast) cells by Raman spectroscopy", *Journal of Raman Spectroscopy,* Volume 39, Issue 12, p.1859 - 1868, (2008)

Agarwal V.; Thotla S.; Mahajani S.M.

"Attainable regions of reactive distillation-Part I. Single reactant non-azeotropic systems", *Chemical Engineering Science*, Volume 63, Issue 11, p.2946 - 2965, (2008)

Agarwal V.; Thotla S.; Kaur R.; Mahajani S.M.

"Attainable regions of reactive distillation. Part II: Single reactant azeotropic systems", *Chemical Engineering Science*, Volume 63, Issue 11, p.2928 - 2945, (2008)

Narayanan J.; Abdul Rasheed A.S.; Bellare J.R.

"A small-angle X-ray scattering study of the structure of lysozyme-sodium dodecyl sulfate complexes", *Journal of Colloid and Interface Science*, Volume 328, Issue 1, p.67 - 72, (2008)

Vinod P.K.U.; Venkatesh K.V.

"A steady state model for the transcriptional regulation of filamentous growth in Saccharomyces cerevisiae", *In Silico Biology*, Volume 8, Issue 3-4, p.207 - 222, (2008)

Nemade P.; Kadam A.M.; Shankar H.S.

"Arsenic and iron removal from water using constructed soil filter - A novel approach", *Asia-Pacific Journal of Chemical Engineering*, Volume 3, Issue 5, p.497 - 502, (2008)

Mehra S.; Charaniya S.; Takano E.; Hu W.-S.

"A bistable gene switch for antibiotic biosynthesis: The butyrolactone regulon in Streptomyces coelicolor", *PLoS ONE*, Volume 3, Issue 7, (2008)

Karra S.; Shaw R.; Patwardhan S.C.; Noronha S.

"Adaptive model predictive control of multivariable time-varying systems", *Industrial and Engineering Chemistry Research,* Volume 47, Issue 8, p.2708 - 2720, (2008)

Bajpai S.; Tirumkudulu M.S.

"An experimental study of impulsively started turbulent axisymmetric jets", *European Physical Journal B*, Volume 61, Issue 3, p.293 - 297, (2008)

Nandola N.N.; Bhartiya S.

"A multiple model approach for predictive control of nonlinear hybrid systems", *Journal of Process Control,* Volume 18, Issue 2, p.131 - 148, (2008)

Pham T.T.; Sunthar P.; Prakash

"An alternative to the bead-rod model: Bead-spring chains with successive fine graining, J.R. , *Journal of Non-Newtonian Fluid Mechanics,* Volume 149, Issue 1-3, p.9 - 19, (2008)

Thaokar R.M.

"Brownian motion of a torus", Colloids and Surfaces *A: Physicochemical and Engineering Aspects,* Volume 317, Issue 1-3, p.650 - 657, (2008)

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