

Department of Chemical Engineering



4.4.1. Introduction

The Department of Chemical Engineering was established in 1959. The department has permanent faculty members who carry out research in state-of-the-art areas. The focus of the research is on reaction and transport, energy, materials and the environment. The faculty work towards analysing these systems by understanding their behaviour at the molecular level as well as using a systems approach.

4.4.2. Academic Programmes

New courses introduced

Sl. No.	Course No. and Title
1	CH6760 Hydrodynamics of Complex Fluids
2	NPTEL online course for certification titled 'MATLAB Programming for Numerical Computation' during January–March 2016

Students on roll as of September 2015 + research scholars admitted in January 2016

Programme	Year I	Year II	Year III	Year IV	Year V and Others	Total
B.Tech	66	63	68	66	14	277
Dual Degree	18	20	14	19	20	91
M.Tech.	38	30	—	—	2	70
M.S.	11	16	6	4	4	41
Ph.D.	23	27	21	13	38	122
Total	156	156	109	102	78	601

Students/scholars/post-doctoral fellows who attended conferences/workshops/seminars/symposia

Sl. No.	Student/Scholar	Roll No.	Conference/Seminar/Symposium/Workshop	Date and Venue	Financial Assistance from
Abroad					
Ph.D.					
1	Rahul Trivedi	CH10D016	2015 AIChE Annual Spring Meeting	26–30 April 2015, Austin, Texas, USA	IIT Madras
2	Nithya M.	CH11D006	37th Annual International Conference of IEEE–EMBC'15	25–29 August 2015, Italy	IIT Madras
3	Satheesh Kumar	CH11D011	AIChE Spring Summit 2015	26–29 April 2015, Austin, USA	IIT Madras
4	C. Ajith	CH11D017	Fourth International Symposium Frontiers of Polymer Science (FOP 2015)	20–22 May 2015, Reva del Garda, Italy	IIT Madras
5	Fathima Fasmin	CH11D024	227th ECS Meeting	24–28 May 2015, Chicago, Illinois, USA	IIT Madras
6	Jason Ryan Picardo	CH11D026	International Conference on Chemical Kinetics	28 June to 2 July 2015, Ghent, Belgium	IIT Madras
7	Jason Ryan Picardo	CH11D026	MacKie 2015	2–3 July, 2015, Ghent, Belgium	IIT Madras

Sl. No.	Student/Scholar	Roll No.	Conference/Seminar/Symposium/ Workshop	Date and Venue	Financial Assistance from
8	Rajalakshmi C.	CH11D029	International Chemical Congress of Pacific Basin Societies (Pacifichem 2015)	15–20 December, 2015, Hawaii, USA	IIT Madras and IIT alumni
9	Tanneru Hemanth Kumar	CH11D031	227th ECS Meeting	24–28 May 2015, Chicago, Illinois, USA	IIT Madras
10	Danny Raj	CH11D038	AICHE 2015 Annual Meeting	8–13 November 2015, Salt Lake City, USA	IIT Madras
11	Danny Raj	CH11D038	Visit and giving seminar	14–21 November 2015, University of Florida, USA	—
12	Danny Raj	CH11D038	APSDFD 2015	22–24 November 2015, Boston, USA	—
13	Burela Siva Rama Krishna	CH12D001	International Conference on Chemical and Biochemical Engineering	20–22 July 2015, Paris	IIT Madras
14	Savitha R.	CH12D004	International Nanotech and Nanoscience Conference and Exhibition (Nanotech France 2015)	15–17 June 2015, Paris, France	IIT Madras
15	N. Trivikram Reddy	CH12D008	15th Conference of the International Association of Colloid and Interface Scientists (IACIS 2015)	24–29 May 2015, Mainz, Germany	IIT Madras
16	S. Manigandan	CH12D016	IACIS 2015	24–29 May 2015, Mainz, Germany	IIT Madras
17	Anupriya S.	CH12D026	11th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics	20–23 July 2015, South Africa	IIT Madras
18	Bhagavatula N.V.S.S.R. Dinesh	CH12D025	International Conference on Chemical and Biochemical Engineering	20–22 July 2015, Paris	IIT Madras
19	Bhagavatula N.V.S.S.R. Dinesh	CH12D025	68th Annual Meeting of the American Physical Society's Division of Fluid Dynamics	22–24 November 2015, Boston, Massachusetts	IIT Madras
20	Purnima	CH13D005	SDEWES 2015	29 September to 3 October 2015, Dubrovnik, Croatia	IIT Madras
21	Amrutha	CH13D018	229th ECS conference	29 May to 2 June 2016, San Diego, California	IIT Madras
22	Srivalli	CH14D013	CAV 2015	6–10 December 2015, Switzerland	IIT Madras
M.S.					
23	Pooja Bansal	CH12S014	15th Conference on the International Association of Colloid and Interface Scientists	24–29 May 2015, Mainz, Germany	IIT Madras
24	Rahul P.R.	CH12S015	International Conference on Applied Chemistry—ICAC 2015	14–15 May 2015, Amsterdam, The Netherlands	IIT Madras
25	Aditya Prajapati	CH13S015	2015 AIChE Spring Meeting and 11th Global Congress on Process Safety	26–30 April 2015, Austin, USA	IIT Madras
26	Siddharth Rajendra Jain	CH13S022	AIChE Annual Meeting 2015	8–13 November 2015, Salt Lake City, USA	IIT Madras
PDF					
27	S. Seetharaman	CH15IPF01	All in One Conference (Invent-16)	30 January to 1 February 2016, Sharjah, UAE	IIT Madras

Sl. No.	Student/Scholar	Roll No.	Conference/Seminar/Symposium/ Workshop	Date and Venue	Financial Assistance from
India					
Ph.D.					
1	Chinta Sankar Rao	CH11D022	Symbolic Computing and Numerical Programming using MATLAB/Mathematica	10–13 July 2015, NIT Warangal	IIT Madras
2	Tanneru Hemanth Kumar	CH11D031	CHEMCON 2015, Indian Chemical Engineers Congress, 68th Annual Session of Indian Institute of Chemical Engineers	25 December 2015 to 8 January 2016, IIT Guwahati	IIT Madras
3	G. Swaminathan Bhardwaj	CH11D036	Complex Fluids (Comp Flu)	2–4 January 2016, IISER, Pune	IIT Madras
4	Pratiba Biswal	CH11D037	Fifth International Conference on Advances in Energy Research (ICAER)	15–17 December, 2015, IIT Bombay	IIT Madras
5	R. Savitha	CH12D004	Advanced Oxidation Process AOP 2015	12–18 October 2015, Punjab University, Chandigarh	IIT Madras
6	Venkata Reddy Palleti	CH12D009	Fourth International Conference on Advances in Control and Optimization of Dynamical Systems	1–5 February 2016, NIT Trichy	IIT Madras
7	Bhagavatula N.V.S.S.R. Dinesh	CH12D025	Complex System Approach to Self-organization CSAS-2016	1–5 February, 2016, IIT Madras	IIT Madras
8	Abhishek Kumar Gupta	CH13D016	International Conference on Nanostructured Polymer-IC Materials and Polymer Nanocomposites (ICNPM-2015)	12–16 November 2015, Kottayam, Kerala	IIT Madras
9	Amrutha M.S.	CH13D018	CHEMCON 2015	25 December 2015 to 8 January 2016, IIT Guwahati	IIT Madras
10	Amrutha M.S.	CH13D018	Asian Pacific Corrosion Control Conference (APCCC17)	27–31 January 2016, IIT Bombay	IIT Madras
11	Amrutha M.S.	CH13D018	18th National Conference on Corrosion Control	24–26 February 2016, Hotel Green Park, Chennai	IIT Madras
12	Chandra Shekar Besta	CH14D002	Nature Inspired Computing for Engineering Applications	6–8 April 2015, IISc, Bengaluru	IIT Madras
13	Chandra Shekar Besta	CH14D002	International Conference on Advances in Chemical Engineering (ICACE 2015)	20–22 December 2015, NITK, Surathkal	IIT Madras
14	Chandra Shekar Besta	CH14D002	Advances in Control and Optimization of Dynamical Systems (Acods 2016)	2–5, February 2016, NIT Trichy	IIT Madras
15	Chandra Shekar Besta	CH14D002	International Conference on Advances in Dynamics, Vibrations and Control (ICADVC-2016)	23–28, February 2016, NIT Durgapur	IIT Madras
16	Sudhakar Kathari	CH14D009	Acods 2016	2–4 February 2016, NIT Trichy	IIT Madras
17	Babita Kumari Verma	CH14D207	Complex System Approach to Self-organization	1–5 February 2016, IIT Madras	IIT Madras
18	Nikita Saxena	CH14D208	Nature Inspired Computing for Engineering Applications	6–8 April 2015, IISc, Bengaluru	IIT Madras
19	Nikita Saxena	CH14D208	Symbolic Computing and Numerical Programming using MATLAB/Mathematica	10–13 July 2015, NIT Warangal	IIT Madras

Sl. No.	Student/Scholar	Roll No.	Conference/Seminar/Symposium/ Workshop	Date and Venue	Financial Assistance from
20	Nikita Saxena	CH14D208	Advances in Control and Optimization of Dynamical Systems	2-5 February 2016, NIT Trichy	IIT Madras
21	B. Rajasekhar Reddy	CH14D400	CHEMCON 2015	25 December 2015 to 8 January 2016, IIT Guwahati	IIT Madras
22	Kunche Lakshmi Kumar	CH14D403	ICNPM-2015	12-16 November 2015, Kottayam, Kerala	IIT Madras
M.S.					
23	Piyali Dhar	CH14D407	CHEMCON 2015	25 December 2015 to 8 January 2016, IIT Guwahati	IIT Madras
24	Darsha Kumar D.M.	CH13S017	Indian Control Conference 2016	4-6 January 2016, IIT Hyderabad	IIT Madras
25	Vishnu Prasad	CH14S021	CHEMCON 2015	25 December 2015 to 8 January 2016, IIT Guwahati	IIT Madras
26	Sarkar Ila Jogesh Ramala	CH14S027	ESSI's Second National Conference on Materials for Energy Conversion and Storage (MECS 2016)	11-14 March 2016, Department of Physics, Pondicherry University	IIT Madras
27	C. Srinesh	CH14S300	Bioprocessing India 2015	17-19 December, 2015, IIT Madras	IIT Madras
M.Tech.					
28	R. Perumal	CH14M021	10th International High Energy Materials Conference and Exhibits	10-14 February 2016, DRDO, Hyderabad	IIT Madras
29	G. Sathesh Kumar	CH14M027	10th International High Energy Materials Conference and Exhibits	10-14 February 2016, DRDO, Hyderabad	IIT Madras

Students/scholars who won outside prizes and awards

Sl. No.	Student/Scholar	Roll No.	Prize	Awarded by
1	Pratiba Biswal	CH11D037	Energy and Environmental Science Oral Presentation Prize	IIT Bombay
2	Harish Venkatachalapathy	CH12B073	DAAD Working Internships in Science and Engineering Programme Scholarship	DAAD
3	Chandrashekar Besta	CH14D002	Second Prize in the International Conference on Advances in Chemical Engineering	NITK, Surathkal
4	Praneeth Srivanth	CH14B049	First Prize in the Inter-IIT Techspark Competition	Hindustan Unilever Limited
5	B. Shantini	CH14B064	First Prize in the Inter-IIT Techspark Competition	Hindustan Unilever Limited
6	Sai Pavan Abhishek Vinakollu	CH14B058	First Prize in the Inter-IIT Techspark Competition	Hindustan Unilever Limited
7	R. Alekhya	CH15B032	Aditya Birla Scholars for the Year 2015	Aditya Birla Group

Students/scholars who won convocation/Institute Day prizes

Sl. No.	Student/Scholar	Roll No.	Prize
Convocation 2015 prizes			
1	Nirmal L.	CH11B093	Reliance Heat Transfer Private Limited Prize
2	Varshaa N.	CH11B070	C.A. Sastry Endowment Prize
3	Saurabh Bhandari	CH10B102	B. Ravichandran Memorial Prize
4	Aparna M.	CH13M005	Dr. K. Subba Raju Memorial Prize
5	Saurabh Bhandari	CH10B102	Mico-Bosch Prize

Sl. No.	Student/Scholar	Roll No.	Prize
6	R. Aravind	CH11B010	Bhagyalakshmi and Krishna Ayengar Award
7	D.V. Suriapparao	CH13S001	Bhagyalakshmi and Krishna Ayengar Award
Institute Day 2015 prizes			
1	Venkatachalam A.	CH12B094	Dr. Anita Mehta–Damani Prize
2	Shivani Patel	CH10B101	Dr. Anita Mehta–Damani Prize
3	Venkatachalam A.	CH12B094	Prof. Ramanujam Memorial Award
4	Ramachandran B.	CH11B053	Dr. R.K. Viswanath Memorial Prize
5	Aparna M.	CH13M005	Chevron Products Company Prize
6	Vaze Shruti Sanjay	CH13M035	Chevron Products Company Prize
7	Dipin S. Pillai	CH10D017	Institute Research Award
8	Vaishakh Nair	CH11D012	Institute Research Award
9	Jason Ryan Picardo	CH11D026	Institute Research Award
Alumni Day 2015 prizes			
1	Varun Govindaraj	CH10B072	Prof. M. Ramanujam Memorial Award
2	Anand Kumar Tripathi	CH11S011	Ms D.L. Saraswati Memorial Prize

4.4.3. Faculty Members and Their Activities

Faculty

Name	Major Areas of Specialization
Professors	
A. Kannan [Head]	Mathematical modeling, simulation and optimization of chemical processes
Abhijit Deshpande	Rheology of complex fluids, polymers and polymeric composites, processing flow visualization
Arun K. Tangirala	Process systems engineering; control, identification and monitoring; applied signal processing
A.R. Balakrishnan	Thermodynamics of azeotropic mixtures; two-phase flow and boiling in narrow tubes
M. Chidambaram	Process control
R. Nagarajan	Fine particle science and technology; chemical vapour deposition; process intensification using acoustic fields
T. Panda	Bioprocess optimization, bio-microfluidics, bio-nanotechnology
Preeti Aghalayam	Chemical reaction engineering
S. Pushpavanam	Modeling and simulation; nonlinear dynamics; flow visualization
Raghunathan Rengasamy	Process systems engineering, fuel cells, computational discrete microfluidics
S. Ramanathan	Electrochemistry, chemical mechanical planarization for semiconductor processing
R. Ravi	Applied statistical mechanics; foundations of thermodynamics and mechanics; process dynamics and control
P.S.T. Sai	Chemical reactor analysis and design
Shankar Narasimhan	Process design, data mining, fault diagnosis
Sreenivas Jayanti	Fuel cells, combustion, energy systems
Susy Varughese	Physics and mechanics of polymeric materials; polymeric nanocomposites
Tanmay Basak	Microware application; mathematical modeling and simulation
Upendra Natarajan	Polymer science and engineering; molecular simulation; statistical thermodynamics of complex fluids; nanostructured hybrid composite materials
Associate Professors	
Niket S. Kaisare	Catalytic combustion; micro-reactors; advanced process control; energy and fuel processing
Raghuram Chetty	Electrocatalysis, fuel cells, wastewater treatment
R. Ravikrishna	Contaminated sediment remediation; contaminant fate and transport; air pollution process and control
Sridharakumar Narasimhan	Process system engineering, optimization, process control, fault diagnosis

Name	Major Areas of Specialization
Assistant Professors	
M.G. Basavaraja	Directed assembly of colloids; microstructure and rheology of colloids, surfactants, polymer and their mixtures; interfacial rheology; ionic liquids; particulate gels
Ethayaraja Mani	Molecular simulations, self-assembly, mathematical modeling
R. Ramnarayanan	Applying physical chemistry concepts to biology, light and state of matter interaction; solid state materials
T. Renganathan	Multiphase systems, gasification, capture of CO ₂
Sumesh P. Thampi	Hydrodynamics of complex fluids, interfacial flows, active matter
R. Vinu	Thermo-catalytic conversion of biomass to useful intermediates, photocatalysis for environmental decontamination, microkinetic modeling of complex reactions
Professors Emeriti	
K. Krishnaiah	Chemical reactor analysis and design fluidization
Hosted Fellows (Ramalingaswami Fellows)	
K. Vijaya Raghavan	Environmental biotechnology; water quality and waste water treatment
INSPIRE Fellows	
Nirav P. Bhatt	Data analysis, process systems engineering, kinetic modeling
Swagatika Sahoo	System biology, constraint-based metabolic modeling, human metabolism, metabolic disorders, inherited metabolic disorders

Short-term courses/workshops/seminars/symposia/conferences organized by faculty members

Sl. No.	Co-ordinators	Title	Period
Workshops			
1	R. Ravikrishna and Sachin S. Gunthe (CE)	Winter School on Aerosol Measurement and Monitoring Techniques	6–12 December 2015

Short-term courses/workshops/seminars/symposia/conferences attended by faculty members at academic institutions and public sector undertakings

Sl. No.	Faculty Member	Title	Institution	Period
Workshops				
1	Pushpavanam S.	Indo–German Workshop on Advances in Materials, Reaction and Separation Processes	IIT Guwahati	23 February 2016
2	Ramanathan S.	How to Prepare Project Proposal to get Financial Assistance from Sponsoring Agents (one-day workshop)	Government Engineering College, Thrissur	12 January 2016
3	Sreenivas Jayanti	Workshop on SNCR System for DeNO _x Applications in the Cement Industry, by Lechler GmbH, Germany	Hotel My Fortune, Chennai	21 May 2015
4	Vinu R.	Catalysis workshop	University of Manchester, UK	16–17 July 2015
Symposia				
1	Sreenivas Jayanti	National Symposium on Multiphase Flow	NIT Durgapur	23 February 2016
Conferences				
1	Abhijit P. Deshpande	Conference on Complex Fluids	IISER Pune	2–4 January 2016
2	Shankar Narasimhan	Europe–India Conclave (Transforming Transportation – IOT, Clean Energy, Smart Devices, Artificial Intelligence, Big Data & Telematics, Transportation, Smart Artificial Telematics, Insurance)	Hotel Taj Mahal, New Delhi	17 December 2015

Sl. No.	Faculty Member	Title	Institution	Period
3	Shankar Narasimhan	IEEE Recent Advances in Intelligent Computational Systems (address at the plenary session)	IEEE Kerala Section	11 December 2015
4	Sumesh M. Thampi	CompFlu 2016	IISER, Pune	2–4 January 2016
5	Sumesh M. Thampi	International Conference on Emerging Trends in Chemistry and Material Science (ETCM-2016)	Government Engineering College, Thrissur	9–11 December 2015
6	Sumesh M. Thampi	Soft Matter Young Investigators Meet 2015	IIT Madras and IMSc, Chennai	17–20 December 2015
7	Sumesh M. Thampi	XXVII IUPAP Conference on Computational Physics	IIT Guwahati	2–5 December 2015
8	Basavaraja M. Gurappa	Emerging Trends in Chemistry and Materials Science (ETCM-2016)	Department of Chemistry, Gogte Institute of Technology, Udyambag, Belgaum, Karnataka	23 January 2016
9	Basavaraja M. Gurappa	Nanoparticle Assembly: From Fundamentals to Applications (Faraday Discussion: Adsorption of Nano-ellipsoids to Fluid Interfaces and Their Effect on Emulsion Stability)	IIT Bombay, Mumbai	7–9 January 2016
10	Chidambaram M.	Recent Trends in Electronics and Instrumentation Engineering	Adhiyaman College of Engineering, Hosur	1 March 2016
11	Raghuram Chetty	Fourth International Hydrogen and Fuel Cell Conference 2015	The Gateway Hotel, Agra	6–8 December 2015
Short-term courses				
1	Kannan A.	Video-based lectures titled ‘Statistics for Experimentalists’	NPTEL, IIT Madras	June 2015
2	Sreenivas Jayanti	Computational Fluid Dynamics	NPTEL, IIT Madras	January–April 2016
Others				
1	Abhijit P. Deshpande	DST proposal presentation: Pectin/Protein Mixtures as Food Additives for Gelling	IIT Delhi	26 November 2015
2	Kannan A.	CAPE 2015 Conference (invited talk)	SAASTRA University, Thanjavur	8 October 2015
3	Nagarajan R.	Engineers Day (chief guest)	Sree Sastha Institute of Engineering and Technology, Chembarambakkam, Chennai	15 September 2016
4	Nagarajan R.	Saint Gobain Research India’s University Day (presenter)	IC&SR Hall II	30 September 2015
5	Nagarajan R.	Board of Directors meetings	Indian Additives Limited	29 February 2016 and 6 March 2016
6	Nagarajan R.	DST Conclave 2015	Hotel Novotel, Hyderabad	6–7 July 2015
7	Panda T.	BoS meeting	Anna University, Chennai	13 October 2015
8	Ramanathan S.	Faculty Selection (Expert Member)	ISM, Dhanbad	1 March 2016
9	Sai P.S.T.	BoS meeting	GVP College of Engineering, Visakhapatnam	6 June 2015
10	Sai P.S.T.	BoS meeting	A.N. Institute of Technology and Science, Visakhapatnam	20 June 2015
11	Sai P.S.T.	DPC meeting	IIST, Thiruvananthapuram	16 July 2015

Special lectures delivered by faculty members at other institutions

Sl. No.	Faculty Member	Title of Lecture	Institution	Date
1	Kannan A.	Chemistry of Adsorption	SAASTRA University, Thanjavur	9 October 2015
2	Krishniah K.	Mind of Researcher	SCVE, Chennai	31 March 2016
3	Niket S. Kaisare	Model Predictive Control (MPC): A Historical Perspective	Institute of Chemical Technology (ICT), Mumbai	30 May 2015
4	Pushpavanam S.	Mixing Behavior in Micro Channels	IIT Guwahati	23 February 2016
5	Raghuram Chetty	Fuel Cells in Transportation Applications (as part of the online certificate course 'Advances in Automotive Systems')	Department of Engineering Design, IIT Madras	30 December 2015
6	Raghuram Chetty	Fuel Cells: The Perfect Power Partner (at faculty development programme, 'Renewable Energy: Policies and Practices')	Department of Chemical Engineering, TKM College of Engineering, Kollam, Kerala	2 December 2015
7	Raghuram Chetty	Fuel Cells: Power Source for the Future (at AICTE-sponsored short term course under quality improvement programme, titled 'Recent Trends in Energy, Environment and E-waste Management')	Department of Chemical Engineering, Coimbatore Institute of Technology	6 November 2015
8	Sai P.S.T.	Separation Processes in Environmental Applications	SSN College, Chennai	24 June 2015
9	Sreenivas Jayanti	Fifty Years on Since Harlow & Welch (1965): Progress Made in the Computation of Two-Phase Flows	NIT Durgapur	23 February 2016
10	Sreenivas Jayanti	Overview and Challenges in PEM Fuel Cells	BHEL, Hyderabad	6 January 2016
11	Sreenivas Jayanti	Overview of Flow Batteries and Suitability for High Energy Storage	BHEL, Hyderabad	6 January 2016
12	Sreenivas Jayanti	Shape Optimization of Fluid Flow Ducting Using a Shape Function, a Search Method and CFD: Some Early Results (The Distinguished Seminar Series, The Imperial)	Imperial College	29 June 2015
13	Sreenivas Jayanti	NOx Generation and Mitigation in Boilers and Furnaces	Hotel My Fortune, Chennai by Lechler GmbH, Germany	21 May 2015
14	Sumesh M. Thampi	Intrinsic Free Energy in Active Nematics	IIT Guwahati	2–5 December 2015
15	Tanmay Basak	Invited lecture for academic excellence of students	MAM College of Engineering	8 March 2016
16	Vinu R.	Catalytic Fast Pyrolysis of Renewable Feedstocks for Energy and Resource Recovery	IIT Madras	16–17 July 2015

Visits abroad by faculty members

Sl. No.	Faculty Member	Place Visited	Date	Purpose of Visit	Funding from
1	Arun K. Tangirala	Technische Universitat Munchen, Germany	2–28 July 2015	August–Wilhelm Scheer Visiting Professorship	Germany
2	Arun K. Tangirala	Whistler, Canada	7–10 June 2015	International Symposium on Advanced Control of Chemical Processes (ADCHEM 2015)	IIT Madras
3	Arun K. Tangirala	McMaster University, Canada	3–5 June 2015	To explore research collaborations	—
4	Niket Kaisare	Daejeon, South Korea	14 June to 10 July 2015	Research collaboration on diesel reforming	IIT Madras
5	Niket Kaisare	Seoul, South Korea	19 June 2015	Delivering talk titled 'Modeling and Control in Energy Applications: Perspectives from Industry and Academics'	IIT Madras

Sl. No.	Faculty Member	Place Visited	Date	Purpose of Visit	Funding from
6	Pushpavanam S.	Boston, USA	22–24 November 2015	68th Annual Meeting of the American Physical Society's Division of Fluid Dynamics	IIT Madras
7	Sridharakumar Narasimhan	Beijing, China	19–21 October 2015	IFAC Symposium on System Identification	IIT Madras
8	Raghunathan Rengasamy	University of Delaware, USA	16–25 November 2015	Collaborative work in systems biology and fault diagnosis	—
9	Nagarajan R.	USA	23–31 May 2015	Alumni meetings and university visits	—
10	Nagarajan R.	Singapore	7–8 December 2015	119th board meeting of Indian Additives Limited	IIT Madras
11	Nagarajan R.	Montpellier, University, France	16–18 July 2015	To explore a joint master's programme	IIT Madras
12	Sreenivas Jayanti	Zurich, Switzerland	3–5 June 2015	Second Frontiers in Computation Physics Conference: Energy Sciences	IIT Madras
13	Sreenivas Jayanti	Glasgow, Scotland, UK	16–17 June 2015	Sixth International Flow Battery Forum	IIT Madras
14	Sreenivas Jayanti	UK	18–28 June 2015	Project meetings	—
15	Sreenivas Jayanti	Imperial College, London	29 June 2015	To deliver a lecture	IIT Madras
16	Basavaraja M. Gurappa	Julich, Germany	3 June to 31 July 2015	DAAD research	—
17	K. Vijayaraghavan	Chonbuk National Univeristy, South Korea	2 May to 15 June 2016	Collaborative research works and delivering a series of lectures	South Korea

Honours and awards obtained by faculty members

Sl. No.	Faculty Member	Award	Awarded by	Awarded for	Date
Honours					
1	Arun Tangirala	August-Wilhelm Scheer Visiting Professorship	TUV, Munich, Germany	Awarded to outstanding international researchers for engaging in intensive collaborations with TUM researchers	May 2015
Awards					
1	Vinu R.	Young Faculty Recognition Award 2015	IIT Madras	Excellence in teaching and research	5 September 2015
2	Shankar Narasimhan	Prof. M.S. Ananth Institute Chair	IIT Madras	Distinguished and recognized by peers for research and/or technology development and excellence in teaching and service to the institute/nation/profession	16 March 2016

Books

1. T. Panda, R. Arun Kumar and Thomas Theodore. *Statistical Optimization of Biological Systems*, CRC Press, Taylor & Francis Group, FL, USA, 2016.
2. K. Vijayaraghavan. *Biosorption of Metals: A Complete Handbook*, Vinanie Publishers, ISBN 978-81-932494-0-6.

Others

1. Abjijit P. Deshpande was nominated an expert member of the selection committee for Scientists/Sr. Scientists in NAL, CS&IR, Bengaluru, on 3 February 2016.
2. Panda T. was nominated a BoS member of the Faculty of Technology at Anna University, Chennai, from April 2015 to 2018 and a BoS member at GITAM University, Vishakhapatnam, on 26 March 2016.

- P.S.T. Sai was nominated a subject expert of the Faculty Selection Committee of NIT, Warangal on 4 February 2016.
- Sreenivas Jayanti was nominated to the Faculty Selection Committee in the Department of Chemical Engineering at IIT Kharagpur on 11 March 2016.
- Kannan A. was nominated to the IIT Roorkee Faculty Selection Committee with effect from 17 November 2015.
- Shankar Narasimhan was co-opted a member of the SERB Programme Advisory Committee in Chemical and Environmental Engineering with effect from 17 November 2015.

Fellowships of academies and professional societies

Sl. No.	Faculty Member	Year of Admission
INAE		
1	Shankar Narasimhan	2013
2	Balakrishnan A.R.	2003
TNASc		
1	Balakrishnan A.R.	1996
Institute of Engineers		
1	Balakrishnan A.R.	2013
CSIR—Central Institute of Mining and Fuel Research, Dhandbad		
1	Sreenivas Jayanti	2013–2016

Editorial boards of journals

Sl. No.	Faculty Member	Position (Editor/Member)	Journal
1	A.R. Balakrishnan	Editor	<i>International Journal of Heat and Mass Transfer</i>
2	A.R. Balakrishnan	Editor	<i>International Communications in Heat and Mass Transfer</i>
3	A.R. Balakrishnan	Editor	<i>Journal of Energy, Heat and Mass Transfer</i>
4	A.R. Balakrishnan	Editor-in-Chief	<i>Journal of the Institution of Engineers (India): Series E (Chemical and Textile Engineering)</i>
5	Panda T.	Member	<i>Advances in Science, Engineering and Medicine</i> (American Scientific Publishers, USA)
6	Raghuram Chetty	Member	<i>Nano Hybrids</i>
7	Shankar Narasimhan	Member	<i>Indian Chemical Engineer: International Journal of Advances in Engineering Sciences and Applied Mathematics</i>
8	Tanmay Basak	Associate Editor	<i>International Journal of Heat and Mass Transfer</i>
9	Tanmay Basak	Associate Editor	<i>International Communications in Heat and Mass Transfer</i>

4.4.4. Design and Development Activities

New facilities added or major equipment procured

- 150-user University License (software for chemical process simulation) for 5 years with effect from March 2016, hosted by server, provided by ME and housed in CC
- Inauguration of renovated Chemical Engineering Auditorium (MSB241) on 18 January 2016, with contributions from Dr. M.G. Parameswaran (BT/1977/CH) and Dr. Shrikumar Suryanarayan (BT/1982/CH)

Patents filed

Sl. No.	Faculty Members/Students	Title of Patent
1	Pushpavanam S., Palanivelu and Ragavindra Dhirhi	Molten Fluid Flowrate Controller. (with Heater and Temperature Controller)
2	Raghunathan Rengaswamy, Shankar Narasimhan, Resmi Suresh, Ganesh Sankaran and Sam Mathew	A Generalized Framework for Optimizing Resource Utilization in Resource Sharing Networks

Patents obtained

Sl. No.	Faculty Members	Title of Patent
1	Sreenivas Jayanti and Sivaji Seepana	A Method of, and, an Apparatus for Combusting Hydrocarbon Fuels for Providing a Clean Heat/Energy Source, No. 258154

4.4.5. Research and Consultancy**Sponsored research projects**

Sl. No.	Title	Period	Funding Agency	Amount (lakhs of ₹)	Co-ordinators
1	Dynamic Light Scattering	2015–2016	Maintenance of Capital Equipment	6.20	Abhijit P. Deshpande
2	Large Amplitude Oscillatory Shear of Physically Aggregating Complex Fluids	2014–2017	DST	54.26	Abhijit P. Deshpande, Basavaraja M. Gurappa
3	Development of Unsupervised Detection and Classification Methods in Seismic Data Analysis	2016–2019	Board of Research in Nuclear Sciences	22.15	Arun K. Tangirala
4	Institute Research and Development Junior Level Award	2014–2017	Research Fund	20.00	Arun K. Tangirala
5	Center for Research on Confined Soft Matter	2014–2016	Team Research Project	200	Basavaraja M. Gurappa, Abhijit P. Deshpande, Ethayaraja Mani, Sunil Kumar P.B., Dilip Kumar Sathapathy, Aditi Simha, Nandita Madhavan, Edamana Prasad
6	Nanoparticle Films for Water Evaporation Retardation: Film Elasticity, Rupture and Re-formation	2013–2016	CSIR	27.40	Basavaraja M. Gurappa
7	Oppositely Charged Particles at Interface: Microstructure, Mechanical Properties and Their Application in Emulsion and Foam Stabilization	2015–2018	DST	61.10	Basavaraja Madivala Gurappa, Ethayaraja Mani
8	Self-assembly of Charged Janus Colloids: A Route to Advanced Functional Materials	2013–2016	DST	5.97	Ethayaraja Mani
9	Role of Indian Spice Nanoemulsions in Enhancing Antibacterial Antifungal and Anticancer Efficacy	2015–2018	DST	33.20	Nagarajan R.
10	Process Intensification	2014–2015	Alumni Association	3.05	Nagarajan R.
11	Model Order Reduction for Convection Diffusion Process with Applications to Reformer	2015–2017	Nissan Research Support Program	10.73	Niket S. Kaisare, Sridharakumar Narasimhan
12	Multi-scale Modeling Analysis and Control of Reacting Systems for Energy Applications	2014–2016	New Faculty Initiation Grant	5.00	Niket S. Kaisare
13	Identification of Heterogeneous Reaction Systems Based in Multi-sensor Data—INSPIRE Faculty Award	2013–2018	DST	86.27	Nirav Pravinbhai Bhat
14	Empowerment of the Differently Abled Persons	2015–2016	Socially Relevant Projects	3.00	Pushpavanam S.

Sl. No.	Title	Period	Funding Agency	Amount (lakhs of ₹)	Co-ordinators
15	Development of Dry Slag, Granulation Technology and Energy Recovery System for Blast Furnace Slag for Producing Clinker Compatible Product	NULL	Ministry of Steel	40.00	Pushpavanam S., Ajay Kumar Shukla, Sabita Sarkar
16	Svagata.eu: Experience Europe as an Indian	2013–2017	European Commission	4.00	S. Pushpavanam
17	A Computational Experimental Framework for Conceptualization, Design and Synthesis of Large-Scale Complex Droplet-Based Microfluidic Networks	2014–2016	New Faculty Scheme	35.00	Raghunathan Rengaswamy
18	Titania Nanotubes as an Alternative Catalyst Support for Direct Methanol Fuel Cells	2013–2016	Ministry of New and Renewable Energy	52.12	Raghuram Chetty (PI), S. Ramaprabhu (Co-PI, PH)
19	High Resolution Scanning Electron Microscope (HR-SEM)	2016–2017	Maintenance of Capital Equipment	6.50	Raghuram Chetty
20	PVD–Electrochemical Hybrid Method to Eliminate Toxic H ₂ Se in CIGS Solar Cell Fabrication Process	2013–2016	DST–SERI	93.90	S. Ramanathan, Kasi Viswanathan
21	Mechanistic Investigations of Electrochemical Reactions Using Nonlinear Electrochemical Impedance Spectroscopic Experiments	2015	DST	45.00	Ramanathan S., Kamaraj M. (MM)
22	Gas Chromatography–Mass Spectrometry (GC–MS)	2015–2016	Maintenance of Capital Equipment	1.15	Ravikrishna R.
23	High Pressure Liquid Chromatography (HPLC) System	2016–2017	Maintenance of Capital Equipment	1.15	Ravikrishna R.
24	Gas Chromatography (GC-MS)	2016–2017	Maintenance of Capital Equipment	1.00	Ravikrishna R.
25	Unsteady State Phase Holdup Characteristics of Three-Phase Inverse Fluidized Bed	2012–2016	New Faculty Scheme	5.00	Renganathan T.
26	GTWG Proposal on Advance Coal Technology	2014–2017	DST	63.63	Sreenivas Jayanti, Preeti Aghalayam
27	Experiment Design Using Convex Optimization	2013–2016	Board of Research in Nuclear Sciences	19.16	Sridharkumar Narasimhan
28	Improving Targeting Community Health Through a Women's Cancer Screening Program	2014–2016	Socially Relevant Projects	3.00	Sridharkumar Narasimhan, Basavaraja Madivala Gurappa
29	Soft and Active Matter for Microfluidics and Micromachines	2016–2019	New Faculty Scheme	30.00	Sumesh P. Thampi
30	Active Soft Matter to Power Micro-machines	2015–2017	New Faculty Initiation Grant	5.00	Sumesh P. Thampi
31	Systems Biology for Enumeration of Clinical Heterogeneity of Metabolic Disorders—INSPIRE	NULL	DST	86.27	Swagatika Sahoo
32	Molecular Interaction Between Water-Soluble Polymers and Ionic Surfactants: Insights from Atomistic Molecular Dynamics Simulation	2013–2017	DST	17.00	Upendra Natarajan

Sl. No.	Title	Period	Funding Agency	Amount (lakhs of ₹)	Co-ordinators
33	Design and Development of Hybrid Biofilter to Treat Polluted Urban Runoff: Role of Soil, Plants Microbes and Sorbent Materials	2013–2016	DST	13.75	Vijayaraghavan K.
34	Green Roofs: An Extensive Study to Assess the Role of Substrate, Plants and Soil Microbes to Improve Runoff Quality	2012–2017	DBT, GoI	85.97	Vijayaraghavan K.
35	SDT Q600—Simultaneous Thermogravimetric Analyzer / Differential Scanning Calorimeter	2015–2016	Maintenance of Capital Equipment	3.40	Vinu R.
36	Fourier Transform Infrared Spectrometer	2016–2017	Maintenance of Capital Equipment	2.50	Vinu R.
37	2D–Gas Chromatograph–Mass Spectrometer (2D-GC/MS)	2016–2017	Maintenance of Capital Equipment	1.00	Vinu R.
38	PEG Decomposition Studies	2016–2017	Sandvik Asia Private Limited, Dapodi, Pune	0.45	Vinu R.
Sponsored international collaborative project					
39	Optimization of Thermal and Shock Wave Damage during Selective Tissue Cell Removal Using Laser Pulse Shaping	2012–2015	DST (Indo–South African Collaborative Project)	11.01	S.K. Das, Panda T. and Franz-Josef Kahlen

Industrial consultancy projects

Sl. No.	Faculty Members	Title	Industry	Amount (lakhs of ₹)
1	Basavaraja Madivala Gurappa, Abhijit P. Deshpande	Microstructure Characterization of Emulsion Using Interfacial Rheology	Unilever Industries Private Limited	16.18
2	Kannan A.	Performance Guarantee Test Certification for TB4 and TGS Cross-flow Cooling Towers	VA Tech Wabag Limited	6.84
3	Nagarajan R., Pradeep T.	Stain-Free Glass and Building Materials	Saint–Gobain Research India Limited	41.04
4	Preeti Aghalayam	Analysis of Coal Using Various Characterization Techniques	Common Code	—
5	Preeti Aghalayam	Reduction in Detailed Reaction Mechanisms for Carbon Black Production	Aditya Birla Science and Technology	7.65
6	Pushpavanam S., Sabita Sarkar	Modeling a Cell Settler	Sudhin Biopharma Company	15.12
7	Pushpavanam S., Ajay Kumar Shukla	Development of Technology for Clinker Production Through Dry Granulation of BF Slag and Energy Recovery	JSW Steel Limited	15.00
8	Raghuram Chetty	HR–SEM Analysis CH	Common Code	5.00
9	Renganathan T., Krishnaiah K.	Design of Chlorine Dioxide Generator	Vasu Chemical Industries	5.62
10	Shankar Narasimhan	Data Reconciliation in Thermal Power Plants	ABB Limited	10.70
11	Sreenivas Jayanti	Assessment of Flow Regimes in Horizontal Boiling Tube	Common Code	—
12	Vinu R.	Analysis of PEG Decomposition Using Py-GC/MS	Common Code	—

RBIC projects

Sl. No.	Faculty Member	Title	Industry	Amount (lakhs of ₹)
1	Vinu R., Sreenivas Jayanti	Screening of EFB, Woody Biomass and Casuarina for Fast Pyrolysis Product Distribution and Fast Pyrolysis Kinetics	Valmet Chennai Private Limited	3.44
2	Vinu R., B.V.S.S.S. Prasad (ME), Chakravarthy S.R. (AE), Sundararajan T. (ME)	Modelling and Design of Lab-Scale and Pilot-Scale Rotary Kiln Boiler for MSW Combustion and Heat Recovery with Emissions Treatment	BHEL, Trichy	17.86
3	Vinu R.	Improving the Selectivity of Ethylbenzene Hydroperoxide During the Oxidation of Ethylbenzene in the SMPO Process	Shell India Markets Private Limited	25.08

Faculty members' participation with other institutions under MoUs

Sl. No.	Faculty Member	Details of Participation	University/Institution
1	Basavaraja M. Gurappa	DAAD research stay	Forschungszentrum Julich Gmbh, Institute of Complex Systems, Germany
2	Ethayaraja Mani	DAAD-IIT Madras bilateral Faculty Exchange Fellowship	Institute for Theoretical Physics, TU-Berlin, Germany

Research publications of the faculty members and research scholars

Papers published in refereed national journals: 3
 Papers published in refereed international journals: 86
 Papers presented at national conferences: 10
 Papers presented at international conferences: 47

Papers published in refereed national journals

1. Ram V.D., Karlmarx A. and Chidambaram M. 2016. Identification of unstable second-order transfer function model with a zero by optimization method. *Indian Chemical Engineer* 58(1): 29–39. ISSN: 00194506. doi:10.1080/00194506.2014.990240, Taylor and Francis Limited.
2. Naidu L.D., Saravanan S., Chidambaram M., Goel M., Das A. and Babu J.S.C. 2015. Nanofiltration in transforming surface water into healthy water: Comparison with reverse osmosis. *Journal of Chemistry* 2015: article no. 326869. ISSN: 20909063. doi:10.1155/2015/326869
3. Srinivasan K., Balamurugan and Jayanti S. 2015. Shape optimisation of curved interconnecting ducts. *Defence Science Journal* 65(4): 300–306. ISSN: 0011748X. doi:10.14429/dsj.65.8353

Papers published in refereed international journals

1. Panta Jojibabu, M. Jagannatham, Prathap Haridoss, G.D. Janaki Ram, Abhijit P. Deshpande and Srinivasa Rao Bakshi. 2016. Effect of different carbon nano-fillers on rheological properties and lap shear strength of epoxy adhesive joints. *Composites Part A: Applied Science and Manufacturing* 82: 53–64. doi:10.1016/j.compositesa.2015.12.003
2. D. Ebenezer, Abhijit P. Deshpande and Prathap Haridoss. 2016. Cross-linked poly(vinyl alcohol)/sulfosuccinic acid polymer as an electrolyte/electrode material for H₂-O₂ proton exchange membrane fuel cells. *Journal of Power Sources* 304: 282–292. doi:10.1016/j.jpowsour.2015.11.048
3. Trivikram Reddy Nallamilli, Bernard P. Binks, Ethayaraja Mani and Madivala G. Basavaraj. 2015. Stabilization of Pickering emulsions with oppositely charged latex particles: Influence of various parameters and particle arrangement around droplets. *Langmuir* 31(41): 11200–11208.
4. Santosh Vasant Daware and Madivala G. Basavaraj. 2015. Emulsions stabilized by silica rods via arrested demixing. *Langmuir* 31(24): 6649–6654.
5. M. Sabapathy, S.D. Christdoss Pushpam, M.G. Basavaraj and E. Mani. 2015. Synthesis of single and multi-patch particles by dip-coating method and self-assembly thereof. *Langmuir* 31(4): 1255–1261.
6. Venkateshwar Rao Dugyala, Sri Muthukuru Jyothi, Ethayaraja Mani, Madivala G. Basavaraj. 2016. Role of electrostatic interactions on the adsorption kinetics of nanoparticles at fluid–fluid interfaces. *Physical Chemistry Chemical Physics* 18: 5499–5508.
7. Sam David Christdoss Pushpam, Madivala G. Basavaraj and Ethayaraja Mani. 2015. Pickering emulsions stabilized by oppositely charged colloids: Stability and pattern formation. *Physical Review E* 92 (5): 052314.

8. Rajeev Ashna, Erapalapati Venkataramana, Nandita Madhavan and Madivala G. Basavaraj. 2016. Conversion of expanded polystyrene waste to nanoparticles via nanoprecipitation. *Journal of Applied Polymer Science* 133(4): 42904. doi:10.1002/app.42904
9. Thriveni G. Anjali and Madivala G. Basavaraj. 2015 Measurement of contact angle of particles at fluid–fluid interface: An overview. *Journal of Surface Science and Technology* 31(1–2): 133–144.
10. Venkateshwar Rao Dugyala and Madivala G. Basavaraj. 2015. Self-assembly of nano-ellipsoids into ordered structures via vertical deposition. *RSC Advances*. doi:10.1039/C5RA09632D (Paper)5, 60079–60084
11. Manigandan Sabapathy, Viswas Kollabattula, Madivala G. Basavaraj and Ethayaraja Mani. 2015. Visualization of the equilibrium position of colloidal particles at fluid–water interfaces by deposition of nanoparticles. *Nanoscale* 7: 13868–13876.
12. Besta C.S. and Chidambaram M. 2015. Centralized P/PI control system design based on equivalent transfer functions for unstable TITO process. *Ninth IEEE International Conference on Industrial and Information Systems, ICIIS 2014*, Gwalior, India, 15–17 December 2014. doi:10.1109/ICIINFS.2014.7036613
13. Dhanya Ram V. and Chidambaram M. 2015. Simple method of designing centralized PI controllers for multivariable systems based on SSGM. *Instrumentation, Systems and Automation Society Transactions* 56: 252–260. ISSN: 00190578. doi:10.1016/j.isatra.2014.11.019
14. Sankar Rao C. and Chidambaram M. 2015. Subspace identification of transfer function models for an unstable bioreactor. *Chemical Engineering Communications* 202(10): 1296–1303. ISSN: 00986445. doi:10.1080/00986445.2014.912635
15. Chandra Shekar Besta and M. Chidambaram. 2016. Tuning of centralized PI controllers by BLT method for TITO systems. *Chemical Engineering Communications* 203(4): 527–538. ISSN: 0098-6445(print), 1563-5201(online). doi:10.1080/00986445.2015.1039121
16. Ram V.D., Karlmarx A. and Chidambaram M. 2016. Identification of unstable second-order transfer function model with a zero by optimization method. *Indian Chemical Engineer* 58(1): 29–39. ISSN: 00194506. doi:10.1080/00194506.2014.990240
17. Samdavid S., Renganathan T. and Krishnaiah K. 2016. Hydrodynamics of a cocurrent downward liquid–liquid extraction column. *RSC Advances* 6(15): 12439–12445. ISSN: 20462069. doi:10.1039/c5ra23649e
18. Srivalli H., Nirmal L. and Nagarajan R. 2015. Effect of cavitation on removal of alkali elements from coal. *Journal of Physics: Conference Series* 656(1): article no. 012107, *Ninth International Symposium on Cavitation, CAV 2015*, SwissTech Convention Center, Lausanne, Switzerland, 6–10 December 2015, code 118001. ISSN: 17426588. doi:10.1088/1742-6596/656/1/012107
19. Balakrishnan S., Reddy V.M. and Nagarajan R. 2015. Ultrasonic coal washing to leach alkali elements from coals. *Ultrasonics Sonochemistry* 27: 235–240. ISSN: 13504177. doi:10.1016/j.ultsonch.2015.05.014
20. Balakrishnan S. and Nagarajan R. 2015. Role of bouncing potential in molten ash impaction. *Chemical Engineering Communications* 202(10): 1360–1367. ISSN: 00986445. doi:10.1080/00986445.2014.927358
21. M. Bhuvaneshwari, V. Iswarya, S. Archanaa, G.M. Madhu, G.K. Suraish Kumar, R. Nagarajan, N. Chandrasekaran and Amitava Mukherjee. 2015. Cytotoxicity of ZnO NPs towards fresh water algae *Scenedesmus obliquus* at low exposure concentrations in UV-C, visible and dark conditions. *Aquatic Toxicology* 162: 29–38. doi:10.1016/j.aquatox.2015.03.004
22. Varun Govindaraj, Deepjyoti Mech, Gaurav Pandey, R. Nagarajan and Jitendra S. Sangwai. 2015. Kinetics of methane hydrate formation in the presence of activated carbon and nano-silica suspensions in pure water. *Journal of Natural Gas Science and Engineering* 26: 810–818. doi:10.1016/j.jngse.2015.07.011
23. Jerome P. Ortmann and Niket S. Kaisare. 2016. Modeling of cryo-adsorption of hydrogen on MOF-5 pellets: Effect of pellet properties on moderate pressure refueling. *International Journal of Hydrogen Energy* 41(1): 342–354. doi:10.1016/j.ijhydene.2015.10.138
24. Bhatt N. and Visvanathan S. 2015. Incremental kinetic identification based on experimental data from steady-state plug flow reactors. *Computer Aided Chemical Engineering* 37: 593–598. ISSN: 15707946. doi:10.1016/B978-0-444-63578-5.50094-3
25. Nithya Murugesan, Siddhartha Singha, Tapobrata Panda and Sarit K. Das. 2016. A diffusion based long-range and steady chemical gradient generator on a microfluidic device for studying bacterial chemotaxis. *Journal of Micromechanics and Microengineering* 26(3): 035011. ISSN: 09601317. doi:10.1088/0960-1317/26/3/035011
26. Singha S. and Panda T. 2015. Optimization of laccase fermentation and evaluation of kinetic and thermodynamic parameters of a partially purified laccase produced by *Daedalea flavida*. *Preparative Biochemistry and Biotechnology* 45(4): 307–335.
27. Sminu Bhaskaran, Ganesh Samdani, Preeti Aghalayam, Anuradda Ganesh, R.P. Singh, R.K. Sapru, P.K. Jain and Sanjay Mahajani. 2015. Experimental studies on spalling characteristics of Indian lignite coal in context of underground coal gasification. *Fuel* 154: 326–337. doi:10.1016/j.fuel.2015.03.066

28. Naidu V.S., Aghalayam P. and Jayanti S. 2016. Evaluation of CO₂ gasification kinetics for low-rank Indian coals and biomass fuels. *Journal of Thermal Analysis and Calorimetry* 123(1): 467–478. ISSN: 13886150. doi:10.1007/s10973-015-4930-4
29. C.N. Pratheeba and Preeti Aghalayam. 2015. Effect of exhaust gas recirculation in NO_x control for compression ignition and homogeneous charge compression ignition engines. *The 12th International Conference on Combustion & Energy Utilisation, Energy Procedia* 66: 25–28. doi:10.1016/j.egypro.2015.02.013
30. Paruya S., Goswami N., Pushpavanam S., Pillai D.S. and Bidyarani. 2016. Periodically-forced density wave oscillations in boiling flow at low forcing frequencies: Nonlinear dynamics and control issues. *Chemical Engineering Science* 140: 123–133. ISSN: 00092509. doi:10.1016/j.ces.2015.09.037
31. Picardo J.R. and Pushpavanam S. 2015. Low-dimensional modeling of transport and reactions in two-phase stratified flow. *Industrial and Engineering Chemistry Research* 54(42): 10481–10496. ISSN: 08885885. doi:10.1021/acs.iecr.5b01432
32. Picardo J.R. and Pushpavanam S. 2015. Laterally stratified flow in a curved microchannel. *International Journal of Multiphase Flow* 75: 39–53. ISSN: 03019322. doi:10.1016/j.ijmultiphaseflow.2015.04.017
33. Picardo J.R., Radhakrishna T.G., Vir A.B., Ramji S. and Pushpavanam S. 2015. Modelling extraction in microchannels with stratified flow: Channel geometry, flow configuration and Marangoni stresses. *Indian Chemical Engineer* 57(3–4): 322–358. ISSN: 00194506. doi:10.1080/00194506.2015.1044027
34. Picardo J.R., Garg P. and Pushpavanam S. 2015. Centrifugal instability of stratified two-phase flow in a curved channel. *Physics of Fluids* 27(5): article no. 054106. ISSN: 10706631. doi:10.1063/1.4921631
35. Job S. Kasule, Jeevan Maddala, Parham Mobed and Raghunathan Rengaswamy. 2016. Very large scale droplet microfluidic integration (VLDMI) using genetic algorithm. *Computers & Chemical Engineering* 85: 94–104. doi:10.1016/j.compchemeng.2015.10.018
36. Raghuram Chetty, K.K. Maniam, W. Schuhmann and M. Muhler. 2015. Oxygen–plasma-functionalized carbon nanotubes as supports for platinum–ruthenium catalysts applied in electrochemical methanol oxidation. *ChemPlusChem* 80: 130–135.
37. K.K. Maniam and Raghuram Chetty. 2015. Electrochemical synthesis of palladium dendrites on carbon support and their enhanced electrocatalytic activity towards formic acid oxidation. *Journal of Applied Electrochemistry* 45: 953–962.
38. S. Rajasekar, Raghuram Chetty, L. Neelakantan. 2015. Low-nickel austenitic stainless steel as an alternative to 316L bipolar plate for proton exchange membrane fuel cells. *International Journal of Hydrogen Energy* 40: 12413–12423.
39. G. Keerthiga, B. Viswanathan and Raghuram Chetty. 2015. Electrochemical reduction of CO₂ on electrodeposited Cu electrodes crystalline phase sensitivity on selectivity. *Catalysis Today* 245: 68–73.
40. Fasmin F., Praveen B.V.S. and Ramanathan S. 2015. A kinetic model for the anodic dissolution of Ti in HF in the active and passive regions. *Journal of the Electrochemical Society* 162(9): H604–H610. ISSN: 00134651. doi:10.1149/2.0251509jes
41. Praveen B.V.S., Cho B.-J., Park J.-G. and Ramanathan S. 2015. Effect of lanthanum doping in ceria abrasives on chemical mechanical polishing selectivity for shallow trench isolation. *Materials Science in Semiconductor Processing* 33: 161–168. ISSN: 13698001. doi:10.1016/j.mssp.2015.01.049
42. Ramanathan Srinivasan, Pradeep V.R. Dandu and S.V. Babu. 2015. Shallow trench isolation chemical mechanical planarization: A review. *ECS Journal of Solid State Science and Technology* 4(11): P5029–P5039.
43. Fathima Fasmin and Ramanathan Srinivasan. 2015. Detection of nonlinearities in electrochemical impedance spectra by Kramers–Kronig transforms. *Journal of Solid State Electrochemistry* 19(6): 1833–1847.
44. W.J. Minkowycz, Tanmay Basak, R. Ravi, S. Jayanti, S.K. Das, Satyajit Roy and R.P. Chhabra. 2016. Professor Arcot R. Balakrishnan on his 65th birthday. *International Journal of Heat and Mass Transfer* 94: 498–499. doi:10.1016/j.ijheatmasstransfer.2015.11.059
45. Samdavid S., Renganathan T. and Krishnaiah K. 2016. Hydrodynamics of a cocurrent downward liquid–liquid extraction column. *Royal Society of Chemistry Advances* 6(15): 12439–12445. ISSN: 20462069. doi:10.1039/c5ra23649e
46. Iyer S.S., Renganathan T., Pushpavanam S., Vasudeva Kumar M. and Kaisare N. 2015. Generalized thermodynamic analysis of methanol synthesis: Effect of feed composition. *Journal of CO₂ Utilization* 10: 95–104. ISSN: 22129820. doi:10.1016/j.jcou.2015.01.00
47. Kumarasamy S., Narasimhan S. and Narasimhan S. 2015. Optimal operation of battery-less solar powered reverse osmosis plant for desalination. *Desalination* 375: 89–99. ISSN: 00119164. doi:10.1016/j.desal.2015.07.029
48. Narasimhan S. and Bhatt N. 2015. Deconstructing principal component analysis using a data reconciliation perspective. *Computers and Chemical Engineering* 77: 74–84. ISSN: 00981354. doi:10.1016/j.compchemeng.2015.03.016

49. Kumar S. and Jayanti S. 2016. Effect of flow field on the performance of an all-vanadium redox flow battery. *Journal of Power Sources* 307: 782–787. ISSN: 03787753. doi:10.1016/j.jpowsour.2016.01.048
50. Avvari R. and Jayanti S. 2016. Flow apportionment algorithm for optimization of power plant ducting. *Applied Thermal Engineering* 94: 715–726. ISSN: 13594311. doi:10.1016/j.applthermaleng.2015.10.135
51. Perumal S.V., Jayanti S. and Nagarajan K. 2015. Effect of impeller type and density difference on the draw down of low density microspheres. *Chemical Engineering Research and Design* 104: 571–578. ISSN: 02638762. doi:10.1016/j.cherd.2015.09.019
52. Gokul Siva Sankar, S. Mohan Kumar, Sridharakumar Narasimhan, Shankar Narasimhan and S. Murty Bhallamudi. 2015. Optimal control of water distribution networks with storage facilities. *Journal of Process Control* 32: 127–137. doi:10.1016/j.jprocont.2015.04.007
53. R. Piramuthu Raja Ashok, Mathew Shaji Thomas and Susy Varughese. 2015. Multi-region to single region shear thinning transitions in drying PEDOT: PSS dispersions—Contributions from charge density fluctuations. *Soft Matter* 11: 8441–8451. Impact factor: 4.029
54. Mohan Das and Susy Varughese. 2016. A novel sonochemical approach for enhanced recovery of carbon fiber from CFRP waste using mild acid–peroxide mixture. *ACS Sustainable Chemistry & Engineering* 4(4): 2080–2087. Impact factor: 4.642
55. Madhuchhanda Bhattacharya and Tanmay Basak. 2016. A review on the susceptor assisted microwave processing of materials. *Energy* 97: 306–338. ISSN: 03605442. doi:10.1016/j.energy.2015.11.034
56. Tanmay Basak, Madhuchhanda Bhattacharya and Soumen Panda. 2015. A generalized approach on microwave processing for the lateral and radial irradiations of various groups of food materials. *Innovative Food Science & Emerging Technologies*. ISSN: 14668564. doi:10.1016/j.ifset.2015.11.009
57. Roy M., Roy S. and Basak T. 2015. Analysis of entropy generation on mixed convection in square enclosures for various horizontal or vertical moving wall(s). *International Communications in Heat and Mass Transfer* 68: 258–266. ISSN: 07351933. doi:10.1016/j.icheatmasstransfer.2015.08.023
58. Monisha Roy, Tanmay Basak and S. Roy. 2015. Analysis of entropy generation during mixed convection in porous square cavities: Effect of thermal boundary conditions. *Numerical Heat Transfer, Part A: Applications* 68(9): 925–957. ISSN: 10407782. doi:10.1080/10407782.2015.102313
59. R. Anandalakshmi and Tanmay Basak. 2015. Natural convection in rhombic enclosures with isothermally heated side or bottom wall: Entropy generation analysis. *European Journal of Mechanics-B/Fluids* 54: 27–44. ISSN: 09977546. doi:10.1016/j.euromechflu.2015.05.004
60. Pratibha Biswal and Tanmay Basak. 2015. Sensitivity of heatfunction boundary conditions on invariance of Bejan's heatlines for natural convection in enclosures with various wall heatings. *International Journal of Heat and Mass Transfer* 89: 1342–1368 (article no. 12038). ISSN: 00179310. doi:10.1016/j.ijheatmasstransfer.2015.05.030
61. Singh A.K., Basak T., Nag A. and Roy S. 2015. Role of entropy generation on thermal management during natural convection in tilted porous square cavities. *Journal of the Taiwan Institute of Chemical Engineers* 50: 153–172. ISSN: 18761070. doi:10.1016/j.jtice.2014.12.026
62. W.J. Minkowycz, Tanmay Basak, R. Ravi, S. Jayanti, S.K. Das, Satyajit Roy, R.P. Chhabra, Gautam Biswas, Pradip Dutta, John W. Rose, Adrian Bejan and Jean Taine. 2016. Professor Arcot R. Balakrishnan on his 65th birthday. *International Journal of Heat and Mass Transfer* 94: 498–499
63. Abhishek Kumar Singh, Tanmay Basak, Avijit Nag and S. Roy. 2015. Heatlines and thermal management analysis for natural convection within inclined porous square cavities. *International Journal of Heat and Mass Transfer* 87: 583–597. doi:10.1016/j.ijheatmasstransfer.2015.03.043
64. M.S. Sulatha and U. Natarajan. 2015. Molecular dynamics simulations of the adsorption of poly(acrylic acid) and poly(methacrylic acid) on dodecyl trimethylammonium chloride micelles in water: Effect of charge density. *Journal of Physical Chemistry-B* 119(38): 12526–12539.
65. A.K. Gupta and U. Natarajan. 2016. Tacticity effect on conformational structure and hydration of poly(methacrylic acid) in aqueous solution: A molecular dynamics simulation study. *Molecular Simulation* 42(9): 725–736.
66. R. Chockalingam and U. Natarajan. 2015. Molecular dynamics simulations investigation of structure and thermodynamic properties of symmetric poly(styrene–block–acrylic acid) (PS–b–PAA) micelle in aqueous solution. *Macromolecular Theory and Simulation* 24(6): 580–594.
67. Vijayaraghavan K., Premkumar Y. and Jegan J. 2016. Malachite green and crystal violet biosorption onto coco-peat: Characterization and removal studies. *Desalination and Water Treatment* 57(14): 6423–6431. ISSN: 194. doi:10.1080/19443994.2015.1011709
68. Vijayaraghavan K. and Joshi U.M. 2015. Application of seaweed as substrate additive in green roofs: Enhancement of water retention and sorption capacity. *Landscape and Urban Planning* 143: 25–32. ISSN: 01692046. doi:10.1016/j.landurbplan.2015.06.00

69. Vijayaraghavan K. and Balasubramanian R. 2015. Is biosorption suitable for decontamination of metal-bearing wastewaters? A critical review on the state-of-the-art of biosorption processes and future directions. *Journal of Environmental Management* 160: 283–296. ISSN: 03014797. doi:10.1016/j.jenvman.2015.06.030
70. Vijayaraghavan J., Bhagavathi Pushpa T., Sardhar Basha S.J., Vijayaraghavan K. and Jegan J. 2015. Evaluation of red marine alga *Kappaphycus alvarezii* as biosorbent for methylene blue: Isotherm, kinetic, and mechanism studies. *Separation Science and Technology* (Philadelphia) 50(8): 1120–1126. ISSN: 01496395. doi:10.1080/01496395.2014.965260
71. Kayalvizhi K., Vijayaraghavan K. and Velan M. 2015. Biosorption of Cr(VI) using a novel microalga *Rhizoclonium hookeri*: Equilibrium, kinetics and thermodynamic studies. *Desalination and Water Treatment* 56(1): 194–203. ISSN: 19443994. doi:10.1080/19443994.2014.932711
72. Praveen R.S. and Vijayaraghavan K. 2015. Optimization of Cu(II), Ni(II), Cd(II) and Pb(II) biosorption by red marine alga *Kappaphycus alvarezii*. *Desalination and Water Treatment* 55(7): 1816–1824. ISSN: 19443994. doi:10.1080/19443994.2014.927334
73. Vijayaraghavan K. and Raja F.D. 2015. Interaction of vermiculite with Pb(II), Cd(II), Cu(II) and Ni(II) ions in single and quaternary mixtures. *Clean—Soil, Air, Water* 43(8): 1174–1180. ISSN: 18630650. doi:10.1002/clen.201400423
74. Vijayaraghavan K. and Jegan J. 2015. Entrapment of brown seaweeds (*Turbinaria conoides* and *Sargassum wightii*) in polysulfone matrices for the removal of praseodymium ions from aqueous solutions. *Journal of Rare Earths* 33(11): 1196–1203. ISSN: 10020721. doi:10.1016/S1002-0721(14)60546-9
75. Bhagavathi Pushpa T., Vijayaraghavan J., Sardhar Basha S.J., Sekaran V., Vijayaraghavan K. and Jegan J. 2015. Investigation on removal of malachite green using EM based compost as adsorbent. *Ecotoxicology and Environmental Safety* 118: 177–182. ISSN: 01476513. doi:10.1016/j.ecoenv.2015.04.033
76. Premkumar Y. and Vijayaraghavan K. 2015. Biosorption potential of coco-peat in the removal of methylene blue from aqueous solutions. *Separation Science and Technology* (Philadelphia) 50(9): 1439–1446. ISSN: 01496395. doi:10.1080/01496395.2014.968262
77. T. Ashokkumar and K. Vijayaraghavan. 2016. Brown seaweed-mediated biosynthesis of gold nanoparticles. *Journal of Environment & Biotechnology Research* 2(1): 45–50.
78. SriBala G., Chennuru R., Mahapatra S. and Vinu R. 2016. Effect of alkaline ultrasonic pretreatment on crystalline morphology and enzymatic hydrolysis of cellulose. *Cellulose* 23(3): 1725–1740. ISSN: 09690239. doi:10.1007/s10570-016-0893-2
79. Nair V., Dhar P. and Vinu R. 2016. Production of phenolics via photocatalysis of ball milled lignin–TiO₂ mixtures in aqueous suspension. *Royal Society of Chemistry Advances* 6(22): 18204–18216. ISSN: 20462069. doi:10.1039/c5ra25954a
80. Nair V. and Vinu R. 2015. Production of guaiacols via catalytic fast pyrolysis of alkali lignin using titania, zirconia and ceria. *Journal of Analytical and Applied Pyrolysis*. ISSN: 01652370. doi:10.1016/j.jaap.2016.03.020
81. Ojha D.K. and Vinu R. 2015. Fast co-pyrolysis of cellulose and polypropylene using Py-GC/MS and Py-FT-IR. *Royal Society of Chemistry Advances* 5(82): 66861–66870. ISSN: 20462069. doi:10.1039/c5ra10820a
82. Suriapparao D.V. and Vinu R. 2015. Resource recovery from synthetic polymers via microwave pyrolysis using different susceptors. *Journal of Analytical and Applied Pyrolysis* 113: 701–712 (article no. 3481). ISSN: 01652370. doi:10.1016/j.jaap.2015.04.021
83. Ojha D.K. and Vinu R. 2015. Resource recovery via catalytic fast pyrolysis of polystyrene using zeolites. *Journal of Analytical and Applied Pyrolysis* 113: 349–359 (article no. 3433). ISSN: 01652370. doi:10.1016/j.jaap.2015.02.024
84. Tripathi A.K., Ojha D.K. and Vinu R. 2015. Selective production of valuable hydrocarbons from waste motorbike engine oils via catalytic fast pyrolysis using zeolites. *Journal of Analytical and Applied Pyrolysis* 114: 281–292. ISSN: 01652370. doi:10.1016/j.jaap.2015.06.009
85. Suriapparao D.V. and Vinu R. 2015. Bio-oil production via catalytic microwave pyrolysis of model municipal solid waste component mixtures. *Royal Society of Chemistry Advances* 5(71): 57619–57631. ISSN: 20462069. doi:10.1039/c5ra08666c
86. Suriapparao D.V., Pradeep N. and Vinu R. 2015. Bio-oil production from *Prosopis juliflora* via microwave pyrolysis. *Energy and Fuels* 29(4): 2571–2581. ISSN: 08870624. doi:10.1021/acs.energyfuels.5b00357

Papers presented at national conferences

1. Vishnu Prasad, Snigdha Sree and Preeti Aghalyam. No reduction using Pt and Ag catalysts. *CHEMCON 2015, Indian Chemical Engineers Congress, 68th Annual Session of Indian Institute of Chemical Engineers, IIT Guwahati, 25 December 2015 to 8 January 2016.*
2. Hemanth Kumar, Srinivasan Raman, Brain Buueeks and Raghunathan Rengasamy. Gas mixing based rapid humidity control in PEM fuel cells. *CHEMCON 2015, Indian Chemical Engineers Congress, 68th Annual Session of Indian Institute of Chemical Engineers, IIT Guwahati, 25 December 2015 to 8 January 2016.*

3. R. Savitha, R. Ravikrishna and Raghuram Chetty. Visible activity of biphasic TiO₂ nanotubes. *National Conference on Advanced Oxidation Process (AOP-2015)*, Punjab University, Chandigarh, India, 15–16 October 2015.
4. Bincy George and Raghuram Chetty. Pt deposited on titania nanotubes for the electrochemical oxidation of methanol. *Second National Conference on Materials for Energy Conversion and Storage*, Pondicherry University, Pondicherry, India, 11–13 March 2016.
5. Ila Sarkar and Raghuram Chetty. Pt anchored on functionalized graphene nanosheets for methanol oxidation in fuel cells. *Second National Conference on Materials for Energy Conversion and Storage*, Pondicherry University, Pondicherry, India, 11–13 March 2016.
6. Bharath Ravikumar and Raghuram Chetty. Palladium electrodeposited on carbon as electrocatalyst for direct formic acid fuel cells. *Second National Conference on Materials for Energy Conversion and Storage*, Pondicherry University, Pondicherry, India, 11–13 March 2016.
7. Amrutha M.S., Sujatha Sunil and S. Ramanathan. 2016. Detection of chikungunya antigen using impedimetric immunosensors. *CHEMCON 2015, Indian Chemical Engineers Congress, 68th Annual Session of Indian Institute of Chemical Engineers*, IIT Guwahati, 25 December 2015 to 8 January 2016.
8. B. Rajasekhar Reddy and Vinu R. 2016. Microwave assisted liquefaction of Indian and Indonesian coals. *CHEMCON 2015, Indian Chemical Engineers Congress, 68th Annual Session of Indian Institute of Chemical Engineers*, IIT Guwahati, 25 December 2015 to 8 January 2016.
9. Piyali Dhar and Vinu R. 2016. Ultrasound assisted valorization of lignin. *CHEMCON 2015, Indian Chemical Engineers Congress, 68th Annual Session of Indian Institute of Chemical Engineers*, IIT Guwahati, 25 December 2015 to 8 January 2016.
10. C. Srinesh, Shankar Narasimhan and Guhan Jayaraman. 2016. Online monitoring of biomass concentration using wear infrared spectroscopy. *Bio Processing India 2015*, IIT Madras, 17–19 December 2015.

Papers presented at international conferences

1. Swaminathan Bharadwaj, P.B. Sunil Kumar, Shigeyuki Komura and Abhijit P. Deshpande. LCST behavior of thermo responsive polymers in binary solvent mixtures. *Complex Fluids—CompFlu 2016*, IISER, Pune, 2–4 January 2016.
2. Perepu S.K. and Tangirala A.K. 2015. Identification of equation error models from small samples using compressed sensing techniques. *IFAC Proceedings Volumes (IFAC-PapersOnline), Ninth IFAC Symposium on Advanced Control of Chemical Processes, ADCHEM 2015*, Whistler, Canada, 7–10 June 2015 (code 117500). ISSN: 14746670.. doi:10.1016/j.ifacol.2015.09.06
3. Perepu S.K. and Tangirala A.K. Classical PID control in presence of missing data using compressed sensing techniques. *Manufacturing for the 21st Century 2015—Topical Conference at the 2015 AIChE Spring Meeting and 11th Global Congress on Process Safety 2015*, Austin, USA, 26–30 April 2015, pp. 5–9 (code 117163). ISBN: 978-151080691-7.
4. Sudhakar Kathari and Arun K. Tangirala. Estimation of network connectivity strengths in linear causal dynamic systems. *IFAC-PapersOnLine*, 49(1): 77–82, *Fourth IFAC Conference on Advances in Control and Optimization of Dynamical Systems, ACODS 2016*, Trichy, India, 1–5 February 2016.
5. Suraj Yerramilli and Arun K. Tangirala. Detection and diagnosis of model–plant mismatch in MIMO systems using plant–model ratio, *IFAC-PapersOnLine*, 49(1): 266–271, *Fourth IFAC Conference on Advances in Control and Optimization of Dynamical Systems, ACODS 2016*, Trichy, India, 1–5 February 2016. doi:10.1016/j.ifacol.2016.03.064
6. Sudhakar Kathari and Arun K. Tangirala. 2016. Estimation of networks connectivity strengths in linear causal dynamic systems. *Advances in Control and Optimization of Dynamical Systems, ACODS 2016*, NIT Trichy, 2–4 February 2016.
7. Basavaraja M. Gurappa. 2016. Structure and properties of particle coated interfaces and their application. *Emerging Trends in Chemistry and Material Science, ETCM-2016*, GIT, Belgaum, Karnataka, 22–23 January 2016.
8. Nikita Saxena and M. Chidambaram. 2016. Tuning of PID controllers for unstable system with 2 unstable poles. *Advances in Control and Optimization of Dynamical Systems*, NIT Trichy, 2–5 February 2016.
9. Chandrashekar Besta and M. Chidambaram. 2016. Decentralized PID controller by synthesis method for multivariable systems. *Advances in Control and Optimization of Dynamical Systems*, NIT Trichy, 2–5 February 2016.
10. Chandrashekar Besta and M. Chidambaram. 2016. Timing of centralized PID controllers by BLT method for unstable TITO systems. *International Conference on Advances in Dynamics, Vibration and Control, ICADVC-2016*, NIT Durgapur, 23–28 February 2016.

11. Chandrashekar Besta and M. Chidambaram. 2015. Modeling of interactive multivariable systems for control. *International Conference on Advances in Chemical Engineering (ICACE 2015)*, NITK, Surathkal, 20–22 December 2015.
12. Nikita Saxena and M. Chidambaram. 2016. Tuning of PID controllers for unstable system with 2 unstable poles. *Advances in Control and Optimization of Dynamical Systems*, 2–5 February 2016, NIT Trichy, 2–5 February 2016.
13. Rahul R. Podi and Kannan A. A DOE study of ultrasound intensified removal of phenol from aqueous solution. *International Conference on Applied Chemistry, ICAC 2015*, Amsterdam, The Netherlands, 14–15 May 2015.
14. Balakrishnan S., Midhun Reddy V., Nilesh Vasa and R. Nagarajan. Suitability of laser-induced breakdown spectroscopy in screening potential additives to mitigate fouling deposits. *13th International Conference on Laser Ablation, COLA 2015*, Cairns, Australia, 4 August to 5 September 2015.
15. Srivalli H., Nirmal L. and Nagarajan R. Effect of cavitation on removal of alkali elements from coal. *Journal of Physics: Conference Series*, 656 (1) (article no. 012107), 3 December 2015, *Ninth International Symposium on Cavitation, CAV 2015*, SwissTech Convention Center Lausanne, Switzerland, 6–10 December 2015 (code 118001). ISSN: 17426588. doi:10.1088/1742-6596/656/1/012107
16. A. Kunte and N.S. Kaisare. Modeling and analysis of heat recirculating microreactor for catalytic combustion of propane. *AIChE Annual Meeting*, Salt Lake City, UT, USA, 10 November 2015.
17. K. Moulis and N.S. Kaisare. Development and analysis of system-wide model for heterogeneous catalytic reactors: A hierarchical approach. *AIChE Annual Meeting*, Salt Lake City, UT, USA, 10 November 2015.
18. Saikrishna P.S., Bhatt N.P. and Pasumarthy R. An LPV approach to performance modeling of a web server on a private cloud. *Proceedings of the American Control Conference*, 2015(28 July 2015): 1519–1524 (article no. 7170948), *2015 American Control Conference, ACC 2015*, Hilton Palmer House, Chicago, USA, 1–3 July 2015 (category number, CFP15ACC-ART; code, 113893). ISSN: 07431619. ISBN: 978-147998684-2. doi:10.1109/ACC.2015.7170948
19. Murugesan N., Panda T. and Das S.K. *E.coli* DH5 α cell response to a sudden change in microfluidic chemical environment. *37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBC 2015*, MiCo Center, Milano Congressi Center, Milan, Italy, 25–29 August 2015 (category number CFP15EMB-ART; code, 116805) 2015 (November): 3213–3216 (article no. 7319076). ISSN: 1557170X. doi:10.1109/EMBC.2015.7319076
20. Nithya Murugesan, Tapobrata Panda and Sarit K. Das (2015) *E. coli* DH-5a cell response to sudden change in microfluidic chemical environment. *37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBC'15*, Milan, Italy, 25–29 August 2015.
21. Bhagavatula N.V.S.S.R. Dinesh and Pushpavanam S. Stability analysis of two phase stratified flow in a rectangular channel. *68th Annual Meeting of the American Physical Society's Division of Fluid Dynamics (DFD 2015)*, Boston, Massachusetts, USA, 22–24 November 2015.
22. Jason Ryan Picardo and Pushpavanam S. Low dimensional modeling of reactions and transport in stratified microflows. *International Conference on Chem Kinetics, ICCK, and Mathematics in (Bio) Chem Kinetics and Engineering, Mackie 2015*, Belgium, 28 June to 3 July 2015.
23. R. Savitha, K. Nolan, A. Morrissey, R. Ravikrishna, P. Selvam and Raghuram Chetty. Single and biphasic TiO₂ nanotubes by electrochemical anodization. *Nanotech France 2015*, Paris, France, 15–17 June 2015.
24. Mohammed Samdani Shaik, Rahul Marathe and Raghuram Chetty. Framework for a sustainable rural electrification system: A socio-technical system approach. *Fifth International Conference on Advances in Energy Research, ICAER 2015*, IIT Bombay, Mumbai, India, 15–17 December 2015.
25. S. Seetharaman and Raghuram Chetty. Carbon xerogel-based nitrogen-doped iron as non-precious oxygen reduction electrocatalyst. *All in One Conference, InVent-2016*, Dubai, UAE, 30 January to 1 February 2016.
26. Amrutha M.S., Srinu Raghavan and S. Ramanathan. Characterisation of effect of dissolved oxygen on Cu–BTA interaction by electrochemical impedance spectroscopy. *Asian Pacific Corrosion Control Conference, APCCC17*, IIT Bombay, 27–31 January 2016.
27. Fasmin F. and Ramanathan S. Effect of CO poisoning of PEM fuel cell anode on impedance spectra-simulations. *ECS Transactions* 66(27): 1–14, *Symposium on Physical and Analytical Electrochemistry, Electrocatalysis, and Photoelectrochemistry General Session—227th ECS Meeting*, Chicago, USA, 24–28 May 2015 (code 112362). ISSN: 19385862. doi:10.1149/06627.0001ecst
28. Burela Siva Rama Krishna and R. Ravi. 2D modelling and simulation of the diffusion of ternary mixture in Stefan Tube. *International Conference on Chemical and Biochemical Engineering*, Paris, 20–27 July 2015.
29. Trivedi R., Renganathan T. and Krishnaiah K. 2015. A simple model to predict the pressure drop in three phase inverse fluidized bed. *Emerging Technologies in Clean Energy for the 21st Century 2015—Topical Conference at the 2015 AIChE Spring Meeting and 11th Global Congress on Process Safety 2015*, Austin, United States, 26–30 April 2015 (code 117165, 978-151080693-1), pp. 128–129.

30. Prajapati A., Renganathan T. and Krishnaiah K. 2015. Kinetic studies of carbon dioxide capture by potassium carbonate supported on activated carbon using a fluidized bed reactor. *15th Topical Conference on Gas Utilization 2015—Topical Conference at the 2015 AIChE Spring Meeting and 11th Global Congress on Process Safety, 2015*, Austin, USA, 26–30 April 2015 (code 117166, 978-151080694-8), p. 283.
31. Darsha Kumar, Shankar Narasimhan and Nirav Bhatt. Diagnosis and rectification of model process mismatch in chemical reaction systems. *Indian Control Conference 2016*, IIT Hyderabad.
32. Venkat Reddy Palleti, Shankar Narasimhan and Raghunathan Rengasamy. Exploiting sensor response times to design sensor networks for monitoring water distribution networks. *Fourth International Conference on Advances in Control and Optimization of Dynamical Systems*, NIT Trichy, 1–5 February 2016.
33. Anupriya and Sreenivas Jayanti. Comparative experimental study of air–water vertical annular, flow through expansion and contraction sections. *11th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics, HEFAT 2015*, Kruger National Park, South Africa, 20–23 July 2015.
34. Purnima and Sreenivas Jayanti. On-board hydrogen production for low temperature fuel cells using ethanol dual reforming. *SDEWES 2015*, Dubrovnik, Croatia, 27 September to 3 October 2015.
35. Pratiba Biswal and Tanmay Basak. 2015. Investigation of thermal efficiency via entropy generation within cavities with curved walls subjected to differential/Rayleigh Bénard heating. *Fifth International Conference on Advances in Energy Research, ICAER*, IIT Bombay, 15–17 December 2015.
36. Rajalakshmi Chockalingam, Upendra Natarajan. Atomistic molecular dynamics simulations of structure and thermodynamic properties of asymmetric polyelectrolyte block copolymer micelle in salt-free aqueous solution. *International Chemical Congress of Pacific Basin Societies, Pacificchem 2015*, 15–20 December 2015, Hawaii, USA.
37. Rajalakshmi Chockalingam and Upendra Natarajan. Molecular dynamics simulations of concentration effect on conformations, hydrogen bond dynamics and translational diffusion of poly(methacrylic acid) in salt-free aqueous solution. *International Chemical Congress of Pacific Basin Societies, Pacificchem 2015*, 15–20 December 2015, Hawaii, USA.
38. A.K. Gupta and U. Natarajan. Counterion specific collapse of fully ionized PAA in water–ethanol mixture in presence of Li⁺ and Cs⁺ alkali metal cations: A molecular dynamics simulation study. *International Conference on Nanostructured Polymeric Materials and Polymer Nanocomposites, ICNPM-2015*, Mahatma Gandhi University, Kottayam, India, 13–15 November 2015.
39. K. Lakshmikummar and U. Natarajan. 2015. Structure and dynamics of aqueous solutions containing polyacrylic acid and non-ionic surfactant pentaethyleneglycol *n*-octyl ether. *International Conference on Nanostructured Polymeric Materials and Polymer Nanocomposites, ICNPM-2015*, Mahatma Gandhi University, Kottayam, India, 13–15 November 2015.
40. Siddharth Rajendra Jain and R. Vinu. 2015. Mechanistic modeling of autoxidation of ethylbenzene. *AICHE Annual Meeting 2015*, Salt Lake City, Utah, USA.
41. Perepu S.K. and Tangirala A.K. 2015. Identification of equation error models from small samples using compressed sensing techniques. *IFAC Proceedings Volumes (IFAC-PapersOnline), Ninth IFAC Symposium on Advanced Control of Chemical Processes, ADCHEM 2015*, Whistler, Canada, 7–10 June 2015, 48(8): 795–800. ISSN: 14746670. doi: 10.1016/j.ifacol.2015.09.06
42. Perepu, S.K and Tangirala A.K. 2015. Classical PID control in presence of missing data using compressed sensing techniques. *Manufacturing for the 21st Century 2015—Topical Conference at the 2015 AIChE Spring Meeting and 11th Global Congress on Process Safety 2015*, pp. 5–9, Austin, United States; 26–30 April 2015. ISBN: 978–151080691-7.
43. Sudhakar Kathari and Arun K. Tangirala. 2016. Estimation of network connectivity strengths in linear causal dynamic systems, *IFAC-Papers Online, Fourth IFAC Conference on Advances in Control and Optimization of Dynamical Systems ACODS 2016*, Tiruchirappalli, India, 1–5 February 2016, 49(1): 77–82.
44. Suraj Yerramilli and Arun K. Tangirala. 2016. Detection and diagnosis of model–plant mismatch in MIMO systems using plant–model ratio, *IFAC-Papers Online, Fourth IFAC Conference on Advances in Control and Optimization of Dynamical Systems ACODS 2016*, Tiruchirappalli, India, 1–5 February 2016, 49(1): 266–271. doi:10.1016/J.Ifacol.2016.03.064
45. Saikrishna P.S., Bhatt N.P. and Pasumarthy R. 2015. An LPV approach to performance modeling of a web server on a private cloud. *Proceedings of the American Control Conference*, 28 July 2015, 2015 (article no. 7170948): 1519–1524, *2015 American Control Conference, ACC 2015*, Hilton Palmer House, Chicago, United States, 1–3 July 2015, (Category number CFP15ACC-ART; Code 113893; ISSN: 07431619, ISBN: 978-147998684-2). doi:10.1109/ACC.2015.7170948
46. Murugesan N., Panda T. and Das S.K. 2015. *E.coli* DH5 α cell response to a sudden change in microfluidic chemical environment. *Proceedings of the Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBS*, 4 November 2015, 2015 (Article no. 7319076): 3213–3216, *37th Annual*

International Conference of the IEEE Engineering in Medicine and Biology Society, EMBC 2015, MiCo Center, Milano Congressi Center Milan, Italy, 25–29 August 2015 (category number, CFP15EMB-ART; code, 116805).

47. Fasmin F. and Ramanathan S. 2015. Effect of CO poisoning of PEM fuel cell anode on impedance spectral-simulations. *ECS Transactions* 66 (27): 1–14, *Symposium on Physical and Analytical Electrochemistry, Electrocatalysis, and Photoelectrochemistry General Session—227th ECS Meeting*, Chicago; United States, 24–28 May 2015 (Code 112362, ISSN: 19385862). doi:10.1149/06627.0001ecst

Distinguished visitors to the department

Sl. No.	Name of the Visitor and Designation	Date of Visit	Purpose of Visit (Title of Seminar)
1	Mr. V. Ravichandran, Chief Engineer, HPC	6 April 2015	Cellulose Nanofiber Composites as Mechanically Adaptive Brain Electrodes
2	Dr. Arjit Sarkar, Postdoctoral Research Associate, University of Pennsylvania, Philadelphia, USA	15 April 2015	Deformation of Colloidal Microstructures
3	Dr. Kadhiraivan Shanmuganathan, Polymer Sciences and Engineering Division, National Chemical Laboratory	22 April 2015	How to Use Virgo Most Effectively
4	Dr. Babu Joseph, Department of Chemical and Biomedical Engineering, University of South Florida, Tampa, Florida	28 May 2015	Catalyst Design for Liquid Fuel Production from Renewable Resources
5	Dr. Arun Ramachandran, Assistant Professor, Department of Chemical Engineering and Applied Chemistry, University of Toronto, Toronto, Ontario, Canada	20 July 2015	The Influence of Secondary Currents on Transport Processes in Concentrated, Viscous, Non-colloidal Suspensions
6	Dr. Aravind Asthagiri, Associate Professor, Chemical and Biomolecular Engineering Department, Ohio State University	13 August 2015	Understanding CO ₂ Electroreduction on Cu Electrodes Through First-Principles Modeling
7	Dr. Shigeyuki Komura, Department of Chemistry, Tokyo Metropolitan University, Japan	8 September 2015	Dynamics of Multi-component Membranes
8	Dr. Aravind Kumar Chandiran, Department of Chemistry, University of California, Berkeley	1 December 2015	Electron Transfer Dynamics in Photoelectrochemical Devices
9	Dr. Kirti Sahu, Head, Department of Chemical Engineering, IIT Hyderabad	16 December 2015	Some Interacting Dynamics of Bubbles and Drops
10	Prof. Gade Pandu Rangaiah, Department of Chemical Engineering, National University of Singapore	5 December 2016	Talk on research activities in NUS
11	Dr. Riddhiman Dhar, Postdoctoral Researcher, EMBL-CRG Systems Biology Program, Centre for Genomic Regulation (CRG), Barcelona, Spain	11 January 2016	Studying Phenotypic Variation in Isogenic Yeast Population Using High Throughput Microscopy
12	Mr. Ajoy Bhattacharya, Associate GM and Head (Production), Liquid Purification Technologies, Business Unit, LANXESS India Private Limited	1 March 2016	Industrial project discussions
13	Dr. R.C. Yalamanchili, COO, Yalamanchili Company	15 March 2016	Constituting award in the department
14	Dr. Rusi Taleyarkhan, Professor, School of Nuclear Engineering, Purdue University, USA	28 March 2016	To discuss collaboration, select IIT Madras students—joint research and technology commercialization/manufacturing in India

4.4.6. Other Activities of the Department

Faculty and staff members

Sl. No.	Description
1	Ms M. Saraswathi, Senior Assistant, was awarded the Non-academic Staff Recognition Award for the year 2014 in recognition of the meritorious service rendered in the institute.
2	Mr. K. Thirunavukkarasu, Junior Technical Superintendent, was awarded the Non-academic Staff Recognition Award for the year 2014 in recognition of the meritorious service rendered in the institute.

Sl. No.	Description
3	Dr. Kannan A., Professor, took charge as the Head of the Department with effect from 29 October 2015.
4	Dr. Arun K. Tangirala was appointed a Professor with effect from 29 July 2015.
5	Dr. R. Nagarajan, Professor, was nominated the Dean (I&AR) for a fresh term of 2 years with effect from 6 September 2015.
6	Mr. Aslam Basha Z. was appointed a Technical Officer with effect from 27 July 2015.
7	Dr. Arun K. Tangirala, Professor, was nominated the Chairman, Managing Committee of Vanavani Matriculation Higher Secondary School, IIT Madras, for 2 years with effect from 27 October 2015.
8	Dr. Sumesh P. Thampi, was appointed an Assistant Professor with effect from 21 September 2015.
9	Dr. Swagatika Sahoo joined as INSPIRE Faculty on 4 January 2016.
10	Dr. A.R. Balakrishnan, was re-employed as a Professor with effect from 1 November 2015.
11	Mr. R. Selva Ganapathy, Junior Technical Superintendent, Department of Chemical Engineering, won the Silver Medal at the Olympic round and the Bronze Medal at the Ranking Round of the 70 m Outdoor Recurve for men in the Eighth Tamilnadu State Archery Championships held during 3–4 October 2015 at Dr. MGR Janaki College of Arts and Science, Chennai.
12	Dr. R. Nagarajan, Professor, was permitted to serve as an Independent Director on the Board of Indian Additives Limited, nominated by the Chennai Petroleum Corporation Limited, for a duration of 5 years from September 2015.

Results obtained from research work

Sl. No.	Scholar/Faculty Member
Ph.D.	
1	Balakrishnan S. and R. Nagarajan: Modeling and Simulation of Fly Ash Deposition on Boiler Heat-Transfer Surfaces and Its Mitigation Strategies for Indian Coals
2	Basavaraja R.J. and Sreenivas Jayanti: Future-Ready Design of a High-Efficiency Gas-Fired Power Plant Based on Chemical-Looping Combustion
3	Beula C. and P.S.T. Sai: Esterification of Long-Chain Fatty Acids with Ethanol using Bronsted Acidic Ionic Liquids as Catalysts
4	Chinta Sankar Rao and M. Chidambaram: Subspace Identification of Unstable Systems
5	Dhanya Ram V. and M. Chidambaram: Identification and Control of Linear Multi-input Multi-output Systems
6	G. Keerthiga, Raghuram Chetty and B. Viswanathan: Electrochemical Reduction of Carbon Dioxide on Copper and Zinc-Based Electrodes in Aqueous Electrolytes
7	K. Jagadeeshwar and Abhijit P. Deshpande: Network Structure and Properties of Poly(Vinyl Alcohol) and Hyaluronic Acid Crosslinked Hydrogel Systems
8	Manokaran A. and S. Pushpavanam: Insights from Spatio-temporal Studies of a Polymer Electrolyte Fuel Cell Under Different Degradation Conditions
9	Mercy Anna Philip and R. Nagarajan: Ultrasound-Assisted Formulation and Characterization of PS/Alumina and PMMA/Alumina Nanocomposites
10	Nabil M. and Sridharakumar Narasimhan: Optimal Selection of Sensors and Controller Parameters for Economic Optimization of Process Plants
11	Siddhartha Singha and T. Panda: Studies on Laccases from <i>Daedalea flavida</i>
12	Simi Santosh and M. Chidambaram: Improved Tuning of Unstable Cascade Control Systems
13	Srinivasan K. and Sreenivas Jayanti: Design of Fluid Flow Ducting Elements Using Shape Functions, a Search Method and CFD
14	Venkata Sesha Praveen Bulusu and S. Ramanathan: Characterization and Modification of Ceria Abrasives for Shallow Trench Isolation Chemical Mechanical Polishing
M.S.	
1	Anand Kumar Tripathi and R. Vinu: Characterization of Thermal Stability of Engine Oils and Resource Recovery from Waste Engine Oils
2	Aanton Kumanan S.A. and Abhijit P. Deshpande: Rheological Characterization of Different Glass Fibre-Networks in Composites
3	Ashutosh Singh and Pushpavanam S.: Linear Stability Analysis of Stratified Fluid Flow in a Channel with an Insoluble Surfactant
4	D. Sujish and R. Ravi Krishna: Selective Separation of Strontium from a Simulated Intermediate Level Nuclear Waste Solution

Sl. No.	Scholar/Faculty Member
5	Dadi V. Suriapparao and Vinu R.: Energy and Resource Recovery from Waste Plastics, Lignocellulosic Biomass and Municipal Solid Wastes via Microwave-Assisted Pyrolysis
6	Daware Santosh Vasant and Basavaraja M. Gurappa: Pickering Emulsion and Bijel Stabilized by Shape Anisotropic Particles
7	Debashish Panda and Kannan A.: Steady State and Dynamic Analysis of Design Improvements to Reactive Distillation Column
8	Easter Prince I., Arun K. Tangirala and R. Nagarajan: Study of the Effect of Media Wear on Particulate Comminution
9	G.S.N.V.K.S.N. Swamy Undi and Sreenivas Jayanti: Experimental Studies of Seawater Flue Gas Desulphurization Using Fountain-Type Gas-Liquid Contactor
10	Gorugantu Sri Bala and R. Vinu: Pretreatment of Cellulose via Conventional and Non-conventional Techniques
11	Kulkarni Shekhar Rajabhau and S. Pushpavanam: Transport Phenomena of Slug Flow in Microchannels
12	Mohamed Shahid U.N., Abhijit P. Deshpande and Lakshmana Rao C.: Piezoelectric Hydrogel Composites
13	Musmade Lalit Raghunath and M. Chidmaram: Controllers Tuning by Learning Automata
14	Peter Kavitha S. and Arun K. Tangirala: Development of a Soft-Sensor for Fineness in a Cement Ball Mill
15	Rahul Kumar and Ravi R.: Application of Corrections to Maxwell's Equal Area Rule in Phase Equilibrium Calculations

Socially relevant activities carried out by the department

- An article on the Intellimeter, which is a joint project by IIT Madras and GyanData, appeared in *The Indian Express* dated 14 February 2016. The project was initially aimed at providing a solution to problems associated with auto-metering, tampering, outdated tariff rates, etc. This project is led by Prof. Ragnathan Rengasamy and Prof. Shankar Narsimhan.
- Ninth Edition of Annual Technical Festival ChemClave-2016, 4-6 March 2016: It provided an opportunity to all budding chemical engineers to compete, exchange ideas, collaborate and learn and be entertained.
- The Magic of Believing in Yourself*, 19 March 2016: Designed to enable scholars to reach great heights in their research work and future careers, initiated by, Prof. Preeti Aghalayam.
Jasco HPLC training was conducted for 20 students. The system, functionalities and operating mechanism were explained by a service engineer to the students. The session was titled 'How Can a Newcomer Start Using HPLC?'
- A seminar titled 'Heat Transfer and Fluid Flow (HTFF-15)' was organized in honour of Prof. Arcot R. Balakrishnan on his 65th birthday by research scholars who worked under him, on Friday, 12 February 2016 at Chemical Engineering Auditorium, IIT Madras. The chief guest was Prof. Sarit Kumar Das, Director, IIT Ropar, and Prof. Bhaskar Ramamurthi, Director, IIT Madras presided over the function.
- Prof. Shankar Narasimhan S. is permitted to serve as Additional Director at MPM Inosoft Private Limited, Nagpur, Maharashtra.

International collaboration

1. Faculty visits

Sl. No.	Faculty Member	Purpose of Visit	Date and Venue
1	Ethayaraja Mani	Research under DAAD-IIT Madras Faculty Exchange Programme	1 July to 31 August 2015, Technische Universität, Berlin, Germany

2. Student visits

Sl. No.	Student	Purpose of Visit	Date and Venue
1	G. Swaminathan Bharadwaj (CH11D036)	Student exchange visit	1 December 2014 to 31 May 2015, Tokyo Metropolitan University, Japan
2	Pinjala Vishnu Vardhan (CH13D004)	Research as part of a collaboration research project	16-30 June 2015, Loughborough, Keele and Birmingham universities
3	Jason Ryan Picardo (CH11D026)	Fulbright-Nehru Doctoral Research Fellowship	15 August 2015 to 15 June 2016, University of Florida
4	Kavimonica (CH14D210)	Project work	1 November 2015 to 31 July 2016, University of Twente, The Netherlands

Major infrastructure development in the department

- The renovated Chemical Engineering Auditorium (MSB 241) was inaugurated by Prof. Bhaskar Ramamurthy, Director, IIT Madras, on 18 January 2016.