

Kumaresan Thangaraj

Aditya Birla Science and Technology Company (P) Ltd, Navi Mumbai, India.
(Aditya Birla Group's Corporate R&D hub, www.adityabirlascienceandtechnology.com)

☎: +91-9819480828

✉: kumaresan.thangaraj@yahoo.com

Profile

A seasoned chemical engineer with 12+ years of experience in R&D as project/program lead fellow. Broad experience in flow modeling, materials and mineral characterization & process upgradation technology, design optimization, sustainable process improvement and scale up.

Extensive experience in delivering projects to customers backed by fundamental science and technology understanding. Wide knowledge in flow dynamics fundamentals, process intensification, Crystallization kinetics, multiphase reactors and computational techniques.

Ability to plan projects and bring them to closure on time. Strategic thinker. Strong leadership and interpersonal skills. Ability to make critical decisions and manage risk. Capable of delegating. Ability to understand complex technical issues. Strong written and verbal skills. Good presentation skills. Ability to independently identify, formulate, and solve problems. Successful project formulation and implementations; Strong communication and interpersonal skills.

Headed Flow Science Laboratory (Scale-up facility); Developed solutions for viscose fiber industry equipment design. Currently, heading the Bauxite and alumina process engineering & sciences group in which the research activities include process & engineering design development around.

Education

<i>Ph. D. (Tech)</i> , Chemical Engineering, Department of Chemical Engineering Institute of Chemical Technology, Mumbai, India. Dissertation: <i>Transport phenomena in multiphase reactors</i> . Advisor: <i>Padma Bhushan Professor J. B. Joshi</i>	2001 – 2005
<i>M. Tech.</i> (Chemical Engineering), Department of Chemical Engineering National Institute of Technology, Tiruchirappalli, India.	1998 – 2000
<i>B. E.</i> (Chemical Engineering), Kongu Engineering College, Tamil Nadu, India	1994 – 1998

Professional Appointments

<i>Lead Scientist</i> - Aditya Birla Science and Technology Co. Ltd., Navi Mumbai	<i>July'17 to till date</i>
<i>Senior Scientist</i> - Aditya Birla Science and Technology Co. Ltd., Navi Mumbai	<i>July'11 to Jun'17</i>
<i>Scientist</i> - Aditya Birla Science and Technology Co. Ltd., Navi Mumbai	<i>Mar'06 to Jun'11</i>
<i>Project Associate</i> - Indian Institute of Science, Bangalore	<i>Jan 2000 to Dec 2000</i>

Major Professional Achievements

1. Delivered detailed process, design and control solution to improve quality of alumina (**2017**).
2. Demonstrated process to improve quality of bauxite supplied to major alumina refineries (**2016**).
3. Improved leaching efficiency of high pressure digestors in Muri Alumina refinery (**2015**).
4. Improved Alumina productivity by 10% based on the fundamental characterization investigations on precipitator design – generated revenue of ~ ₹ 180 Crores (**2014**).
5. Energy reduction by 50% reduction in air injection in the new growth precipitation circuit of Muri Alumina refinery. (**2014**)
6. Implemented major process and design engineering solution in the latest technology delivered by Rio Tinto Alcan to Muri Alumina refinery. (**2013**)
7. Corrected the major bottleneck problem of copper smelter – Outokumpu technology through design solution– generated revenue of ~ ₹ 150 Crores. (**2010**)
8. Improved extraction efficiency (1.5%) in the low temperature digestors of Alumina refinery (**2008**)

Patent

1. **2013** - Provisional Indian patent application filed on “*Mixing apparatus for mixing solid-liquid slurry solution*” Inventors: Kumaresan T., Shirish Thakre, Kiran Bhor, Narinder Walia, Hirak Mitra. Applicants: *Aditya Birla Science and Technology company Ltd. & Hindalco Industries Ltd.*

Career Experience

1. Minerals characterization and process developments/improvements in alumina Bayer process.
2. Extensive experience in impeller/agitator selection and design for lab, pilot and industrial scale mixing applications (30 to 6000m³ size).
3. Developed fundamental and detail knowledge base for draft tube agitated tanks.
4. Developed crystal growth kinetic models for agglomeration phenomena coupling hydrodynamics.
5. Design optimization and implementation of draft tube precipitator, air agitated precipitator, swirl flow technology and multistaged agitated precipitator.
6. Design optimization of new feed well design for effective flocculation.
7. New concept feed well design development for commercial scale flocculation phenomenon.
8. Designed and developed roadmap for alumina process engineering and sciences.
9. Spinnerette design optimization for viscose filament spinning and agitator design for pulpers and viscose tanks.
10. Design evaluation of cup & tube/cone assembly to improve the stability in viscose filament yarn spinning.
11. Process intensification by ultrasound assisted process reactors.
12. Assessed various turbulence models for varieties of flow patterns generated using both computational and experimental fluid dynamics studies.
13. Specialized in aluminium oxide Bayer process simulation, multiphase flow design and optimization using SysCAD process simulation and inhouse empirical models.
14. Developed sourcing strategies, vendor identification and negotiation, development and methodical assessment for Flow Science Laboratory facility at corporate R&D.
15. Implemented several debottlenecking projects in the bauxite digestion section of the Bayer plant.
16. Development and implementation of new strategies on Alumina Bayer design.
17. Developed control strategy and reduced energy consumption for bauxite digestors.
18. Define both short and long term goals for research and development activities.

Awards, Honors and Honorary appointments

1. Coordinator – IBAAS **2018** conference – Value from waste
2. Convener – IIM-NMD-ATM **2017** conference– Recycling & waste management I & II (Advances in Non-Ferrous Metallurgy)
3. Editor member – **2015**, Open Journal of Chemical Engineering and Science.
4. Review member (R&D personnel)–**2015**, Conclave on the “Strengthening the Chemical engineering curriculum for current/future Scenario” during March 13 & 14, 2015 at NIT, Tiruchirappalli.
5. Reviewer **2012 – Till date**, Journal of Crystal growth, Engineering Applications of Computational Fluid Mechanics, Chemical Engineering Science, International Journal of Mineral Processing, Hydrometallurgy.
6. **PRIDE** award for excellence - **2014**, A monetary recognition award from Aditya Birla Group received during Sep 2014.
7. Keynote speaker Oct **2013**, “Sustainability Challenges faced by today’s Alumina refineries”, A workshop on Bauxite Beneficiation and Waste Recycling in Aluminum Industry, IITB, Mumbai, India.
8. The Most Referred Article of **2013**, Referred by "Minerals Engineering International", A largest source of information on mineral processing and extractive metallurgy for “Alumina hydrate precipitation”.
9. External Examiner **2010 – ‘18**, M.Chem/Ph.D., Chemical Engineering, ICT, Mumbai, India.
10. Technical mentor **2009** to ‘**17** – ICT, Mumbai/BITS *B.Tech/M.Tech* students project work (Completed **6**)
11. The Most Referred Article of **2006**, Referred by "Minerals Engineering International", A largest source of information on mineral processing and extractive metallurgy for “Impeller Design”.
12. The Most Downloaded Article during Jan. to Mar. **2006** for *Impeller Design*, Science Direct.
13. *IChE* Award of the Year **2005**, Indian Institute of Chemical Engineer – *IChE*.
14. *UPL* - Senior Research Fellow, United Phosphorous Ltd (**2005 - 2006**).

15. The Most Downloaded Article during Oct. to Dec. **2005** for *Impeller Design*, Science Direct.
16. University Grants Commission Fellowship, ICT, Mumbai (**2001-2005**).
17. Best Presentation Award, TamilNadu Pollution Control Board, India (**2000**).
18. Best Presentation Award, All India Chemical Engineers Association (**1997**).
19. Best Project Award, Kongu Engineering College, Erode, India (**1997-1998**).

Honorary Publications

- Kumaresan, T. & Team, Science and Technology for sustainable future (**2014**) Implementing the best operating practice for an efficient energy management in an alumina refinery, *The Machinist (B2B Magazine)*, 46 - 47.
- Kumaresan, T. Kiran Bhor, Shirish Thakre (**2014**) Design optimization of pump-off suction for Muri New Growth precipitators, *Aditya Birla Group – The Newsletter – Vol 1 (2)*.

Research Publications

- Kumaresan, T., Shirish Thakre. (**2014**) Characterization of flow, mixing and particle suspension in alumina draft tube precipitators of taller aspect ratio, *Hydrometallurgy*, 150, 107 - 122.
- Rohit Sontalia, Pavan Behara, Kumaresan, T., Shirish Thakre. (**2013**) Review on Alumina trihydrate precipitation mechanisms and effect of Bayer impurities on hydrate particle growth rate, *International journal of mineral processing*, 125, 137-148.
- Shirish Thakre, Kumaresan, T., Divyang Shah. (**2011**) Design modification using CFD to improve the performance of the Waste Heat Boiler, *World of Metallurgy - ERZMETALL*, 64, No.6.
- Kumaresan, T., Ajay Kumar, Pandit, A. B., Joshi, J. B. (**2007**) Modeling Flow Pattern Induced by Ultrasound: The Influence of Modeling Approach and Turbulence Models, *Industrial and Engineering Chemistry Research*, 46 (10), 2936-2950.
- Ajay Kumar, Kumaresan, T., Pandit, A. B., Joshi, J. B. (**2006**) Characterization of Flow Phenomena Induced by Ultrasonic Horn, *Chemical Engineering Science*, 61 (22), 7410-7420.
- Kumaresan, T., Nere, N.K., Joshi, J.B. (**2006**) Reply to the comments by I. Fort on "Effect of Internals on the Flow Pattern and Mixing in Stirred Tanks", *Industrial and Engineering Chemistry Research*, 45 (13), 4850-4850.
- Kumaresan, T., Joshi, J. B. (**2006**) Effect of Impeller Design on the Flow Pattern and Mixing in Stirred Tanks, *Chemical Engineering Journal*, 115 (3), 173-193.
- Kumaresan, T., Nere, N. K., Joshi, J. B. (**2005**) Effect of Internals on the Flow Pattern and Mixing in Stirred Tanks, *Industrial and Engineering Chemistry Research*, 44 (26), 9951-9961.
- Kumaresan, T., Meera Sheriffa Begum, K. M., Sivashanmugam, P., Anantharaman, N., Sundaram, S. (**2003**) Experimental Studies on Treatment of Distillery Effluent by Liquid Membrane Extraction, *Chemical Engineering Journal*, 95 (1-3), 199-204.

Conference Proceedings & Presentations

- IBAAS **2018** – *International Bauxite, Alumina and Aluminium Society*, titled “Impact of swirl flow in mixing of oxygen and fuel for burners in rotary kiln”. / Kumaresan T., Kiran Bhor, Uttam Salunke, Keshav Kumar Karn, Hirak Mitra / 5 -7 September, Mumbai, India.
- IBAAS **2018** – *International Bauxite, Alumina and Aluminium Society*, titled “Evaluation of technological alternatives in Bayer alumina process”. / Kumaresan T., Kiran Bhor, Hanuman Gupta, Prasanta Bose, Vilas Tathavadkar / 5 -7 September, Mumbai, India.
- IIM-NMD-ATM **2017** – 55th National Metallurgist day & 71st Annual Technical meeting titled “Feasibility study of low grade bauxite using dry beneficiation method”. / Sanchit Agarwal, Chandrakala Kari, Kumaresan T., Vilas Tathavadkar and Prasanta Bose / 11 - 14 November, BITS, Goa, India.
- ICSOBA **2017** – 35th Conference & Exhibition – *Bauxite, Alumina & Aluminium Industry in Europe and New Global Developments*, titled “Alumina hydrate suspension in the draft tube precipitator design – Batch versus Continuous Operation”. / Kumaresan T., Kiran Bhor, Vilas Tathavadkar, Ashish Mishra, Prasanta Bose and Rohit Chourasia / 2 - 5 October, Hamburg, Germany.
- MPT **2017** – Mineral Processing Technology – *Minimize mineral waste & maximize value*, titled “Mineralogical and microstructural characterization of intermediate solids of Bayer alumina process”. / Chandrakala Kari, Sanchit Agarwal, Kumaresan T., Vilas Tathavadkar, Prasanta Bose / 1 – 3 February, Chennai, India.
- MPT **2017** – Mineral Processing Technology – *Minimize mineral waste & maximize value*, titled “Mineralogical and Microstructural Characterization of Lohardaga Bauxite”. / Sanchit Agarwal, Chandrakala Kari, Kumaresan T., Vilas Tathavadkar, Mahapatra B, and Bijesh Jha / 1 – 3 February, Chennai, India.
- SIMCON **2017** – Simulation conference, titled “In situ air sparging, a solution or trouble for process industries?”. Aditya Birla Science and Technology Company Ltd., /Kumaresan T./ 18 & 19 January 2017. Navi

Mumbai, INDIA

- IBAAS 2016** – *International Bauxite, Alumina and Aluminium Society*, titled “Numerical modeling of high rate decanter (HRD) feed-well”. / Kiran Bhor, Kumaresan T., Ashish Mishra, Tapas Mukhopadhyay/ 26 -28 September, Goa, India.
- IBAAS 2016** – *International Bauxite, Alumina and Aluminium Society*, titled “Experimental analysis on flow and mixing characteristics of scale-down digester model”. / Kiran Bhor, Kumaresan T., Ashish Mishra, Tapas Mukhopadhyay/ 26 -28 September, Goa, India.
- MPT 2016** – *Mineral Processing Technology – Innovations in mineral processing*, titled “Bauxite feedstock and challenges faced by redside alumina refinery”. / Joshwa Tanmay J. Raj, Kumaresan T., Kiran Bhor, Ashish Mishra, Tapas Mukhopadhyay, Sudip Bhattacharyya /5 – 7 January, Pune, India.
- ICSOBA 2015** – *33rd Conference & Exhibition – Global and Gulf region developments in Bauxite, Alumina & Aluminium production*, titled “Assessment of flow pattern and mixing phenomena in alumina digesters”. / Kiran Bhor, Kumaresan T., Ashish Mishra, Narinder Walia, Sudip Bhattacharyya/29 November to 1 December, Dubai, UAE.
- IBAAS 2015** – *4th International symposium – The development and future of aluminium industry in china – Reality and Dream*, titled “Process modeling of alumina tri-hydrate precipitation circuit”. / Vineet Pandey and Kumaresan T./ 25 -27 November, Suzhou, China.
- NMD ATM 2015** – *Indian Institute of Metals - 69rd Annual technical meeting* –, titled “Relation between Bayer alumina process whiteside stability and product quality”. / Kumaresan T., Kiran Bhor, Ashish Mishra , Tapas Mukhopadhyay, Sudip Bhattacharyya /13 - 16 November, Coimbatore, India.
- ICSOBA 2014** – *32nd Conference - New Challenges of Bauxite, Alumina & Aluminium Industry and Focus on China*, titled “Effect of air agitation on the flow phenomena of draft tube precipitator”. / Kumaresan T., Kiran Bhor, Shirish Thakre, Narinder Walia, Ashish Mishra, Sankaranarayanan S., Sadguru Kulkarni /12 to 16 October 2014, Zhengzhou, China.
- SIMCON 2012** – *Simulation conference*, titled “Mixing and suspension characteristics of solid particles in draft tube agitated tanks”. Aditya Birla Science and Technology Company Ltd., /Kumaresan T./ 5 & 6 December 2012. Navi Mumbai, INDIA
- IBAAS 2012** – *International Bauxite, Alumina and Aluminium Society*, titled “Alumina hydrate suspension in the draft tube agitated precipitator design”. / Kumaresan T. and Shirish Thakre/ 3 - 5 December 2012. Nagpur, INDIA
- IMPC 2012** – *XXVI International Mineral Processing Congress*, titled “Alumina trihydrate precipitation: A review on Bayer impurities and hydrate particle growth rate”. / Kumaresan T./ 24 - 28 September 2012 - 02597-02611. New Delhi, INDIA
- Copper 2010** – *7th International Copper Conference*, titled “Design modification using CFD to improve the performance of the Waste Heat Boiler”. / S. Thakre, Kumaresan T., B. Basu, D. Shah, S. Chauhan, K. Khandelwal and Y. Mathur/ June 2010, Hamburg, Germany.
- CFD 2009** – *7th International Conference on Computational Fluid Dynamics in the Minerals and Process Industries* titled “Performance Improvement of Alumina Digestors” / Kumaresan T., S.S. Thakre, B. Basu, K. Kaple, H.P. Gupta, A. Bandi, P. Chaturvedi, N.N. Roy, S.N. Gararia, V. Sapra, R.P. Shah/ 9-11 Dec 2009. Melbourne, Australia.
- CFD 2008** – *6th International Conference on Computational Fluid Dynamics in the Oil & Gas, Metallurgical and Process Industries* titled "Design Optimization of the De-duster to reduce alumina carry-over load on the dry scrubbing system". / Kumaresan T., S. Thakre, B. Basu, B. Jain, K. Pandey, R. Singh, R. Somani / 10 - 12 June 2008. Trondheim, Norway.
- CFD 2008** – *6th International Conference on Computational Fluid Dynamics in the Oil & Gas, Metallurgical and Process Industries* titled "Using Computational Fluid Dynamics for Performance Improvement of the Waste Heat Boiler". / S. Thakre, Kumaresan T., B. Basu, M. Patel, T. Mukhopadhyay, R. Chugh, B. Gauri, K. Khandelwal and Y. Mathur / 10 - 12 June 2008. Trondheim, Norway.
- Asia 2008** – *Biomass and Residues Conference, Asia 2008*, "Showcase Aditya Birla Group's modeling competencies to the bio world". /Kumaresan T./ March 2008. Singapore.
- Annual Technical Meeting of Indian Institute of Metals - 2007*, “Influence of De-duster shape to reduce Alumina carry-over recirculation load on dry scrubbing system”, / Kumaresan T., S. Thakre, B. Basu, B. Jain, K. Pandey, R. Singh, R. Somani / Mumbai, India.
- Setup Flow Sciences Laboratory* - "Emphasis of experimental fluid dynamics for Industrial R&D projects", **2007**, Aditya Birla Science and Technology Center, /Kumaresan T./ Navi Mumbai, India.
- Mineral Processing Technology* - **2007**, "CFD Modeling of Gas-Solid Flow inside the Reaction Shaft of Flash Smelting Furnace", IITB, Mumbai, India.
- CRE X** - *Innovations in Chemical Reactor Engineering conference*, Mexico, Canada, 1-7 pages. Extraction Performance with Paddle Impellers using Pseudoplastic Fluid - ELM vs. Liquid-Liquid Extraction, **2005**.
- ANSYS India Conference - 2006**, “Performance Optimization of Alumina Digestors of HINDALCO, Aditya Birla Group, Renukoot.” Bangalore, India.
- CHEMCON – 2004**, “Spectral Analysis of Intermittent Phenomena in the Stirred Vessel using Laser Doppler

Anemometer”, IChE and AIChE meet, /Kumaresan T. and J. B. Joshi/ Mumbai, India.

AICTE - ISTE - STTP course, “Recent Scenario of Novel Separation Technique in India”, **2000**, NIT, /Kumaresan T./ Tiruchirappalli. India.

School of Energy, “Removal of Trace Pollutants from Effluent – Break through a novel approach”, Environmental Pollution and Pollution Control Methods – **2000**, /Kumaresan T./ Trichirappalli, India.

CHEMFLUENCE-**1998**, “Paper Industry Waste in Energy Trends”, Anna University, /Kumaresan T./ Chennai, India.

CHEMCALL-**1997**, “Utilization of Paper Industry Waste in both Energy and Chemical conversion trends”, Coimbatore Institute of Technology, /Kumaresan T./ Coimbatore, India.

PANSOPHY-**1998**, “Paper Industry in Energy Trends”, Sri Venkateshwara College of engineering, /Kumaresan T./ Chennai, India.

Hands-on proficiency

1. Fortran, SysCAD, Ansys CFX-Fluent, ICEM meshing
2. Laser Doppler Anemometer (LDA), Particle Image Velocimetry (PIV), Ultrasonic Velocity Profiler (UVP), High-speed camera, Infra-red camera, SEM, Optical microscope.

Additional Responsibilities

1. Coordinator, Value from waste **2018**, Aditya Birla Group
2. Chairperson, International publication committee **2015**, ABSTC
3. Core technical committee member, SAP-EPM program **2012**, ABSTC.
4. Executive member, Knowledge Integration Program **2007**, ABSTC.
5. Co-ordinator, Personality Development Program **1999**, NIT, Trichirappalli.
6. Organising committee member, AICTE - ISTE - STTP course, NIT, Trichirappalli.
7. Campus Placement Coordinator – Graduate studies, NIT, Trichirappalli.

Personal

Gender: Male (DOB: 24th November 1976)
 Nationality: Indian (Married)
 Father: KK Thangaraj
 Mother: Kamalam
 Passport No.: H7286399
 Languages Known: English, Hindi, Tamil

Communication Address:

Flat #901, Giriraj Heights, Plot No.5,
 Sector-18, Kharghar, Navi Mumbai
 410210, Maharashtra, India