

## Praveen LINGA

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Website: <http://cheed.nus.edu.sg/stf/chepl/index.html>



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### EDUCATION

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| <b>Ph.D. – Chemical &amp; Biological Engineering</b>   | <b>2009</b> |
| The University of British Columbia (UBC), Vancouver, BC, Canada<br>Thesis: Separation of CO <sub>2</sub> from flue gas (post combustion capture) via hydrate crystallization<br>Supervisor: Professor Peter Englezos |             |
| <b>Master of Technology (M.Tech.) – Chemical Engineering</b>   | <b>2002</b> |
| Indian Institute of Technology, Kharagpur, India<br>Thesis: Simulation studies on furfural extraction column<br>Supervisor: Professor S. Ray   |             |
| <b>Bachelor of Technology (B.Tech.) – Chemical Engineering</b>   | <b>2000</b> |
| University of Madras, Chennai, India<br>First class with distinction   |             |

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### AWARDS & HONORS

- AIChE Singapore Local Section Service Award (2015)
- Advisee (Ang Wei Jun) received the AIChE Singapore Local Section Outstanding Undergraduate Research Project Award for his final year research project (2015)
- Advisee (Stuti Datta) received the 29<sup>th</sup> Innovation and Research High Achievement Award for her UROP research project (2015)
- Advisees (Ang Wei Jun and Nelson Ong) received the 29<sup>th</sup> Innovation and Research Merit Awards for their final year research projects (2015)
- **Most Cited Paper** award from Chemical Engineering Science (2015)
- **Outstanding Reviewer Award** from Chemical Engineering Science Journal (2015)
- **Most Cited Paper** award from International Journal of Greenhouse Gas Control (2015)
- Listed in Marquis Who's Who in the World (2015)
- Listed among the **top 1% of scientists in the field of "Engineering"** by Essential Science Indicators of Thomson Reuters (2014.05 – present)
- Paper [Energy (2013), 50, 364-373] highlighted by Elsevier in a virtual special issue on "**Chemistry and Materials for Energy**" (2014)
- **Outstanding Reviewer Award** from Applied Energy Journal (2013)
- Advisees (Lim Yu An and Yang Ting) received the 27<sup>th</sup> Innovation and Research Merit Awards for their research projects (2013)
- **Most Cited Paper** award from Chemical Engineering Science (2012)
- Award to participate in IEA summer school on carbon dioxide capture and storage, 60 students selected from around the world (2008)

- Best presenter and Excellent paper award at the International Conference on Sustainable Petroleum Development held in Beijing, China (2007)
- Early Faculty Induction Program Fellowship by AICTE in India, awarded for academic excellence and to pursue a career in academia (2000 – 2002)
- Gold Medalist, Class topper in Bachelor's degree (1996 – 2000)
- Bronze Medalist, Stood third in Infant Jesus Matric. Higher Sec. School (1996)

## WORK EXPERIENCE

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- 2010 – Present: **Assistant Professor**, Department of Chemical & Biomolecular Engineering, National University of Singapore
- 2009 – 2010: **Postdoctoral Fellow**, Department of Chemical & Biological Engineering, The University of British Columbia
- 2004 – 2009: **Graduate Research/Teaching Assistant**, Department of Chemical & Biological Engineering, The University of British Columbia
- 2002 – 2004: **Senior Lecturer**, M. S. Engineering College, Kilakarai, India

## EDITORIAL SERVICE

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- **Associate Editor:** Journal of Natural Gas Science and Engineering, 2015/03 – present
- **Managing Guest Editor:** Special issue on gas hydrates and applications in the Journal of Natural Gas Science and Engineering to honor Professor Raj Bishnoi (University of Calgary); Editors: Professor Peter Englezos (UBC Canada), Dr. Praveen Linga (NUS Singapore) & Professor Matthew Clarke (U Calgary), 2015-16

## PROFESIONAL SERVICE

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- 2015: Secretary and Webmaster, AIChE Singapore Local Section, 2015 – present.
- 2015: Technical Program Committee Member, 65<sup>th</sup> Canadian Society of Chemical Engineering (CSChE) Conference, Calgary.
- 2015: Local Organizing Committee Member, 8<sup>th</sup> International Conference on Carbon Dioxide Utilization (ICCDU), July 2015.
- 2015: Scientific Committee Member, 2<sup>nd</sup> International Conference on Fluid Flow, Heat and Mass Transfer, FFHMT – 2015, Ottawa, Canada.
- 2014: Breakout Session: Conducted a break out discussion session on natural gas hydrate recovery along with Professor Richard Coffin (Texas A&M) and Professor Sudeep Punnathanam (IISc Bangalore India) in the Fiery Ice Workshop in Hyderabad India.
- 2014: Session Chair/Co-Chair, The 8<sup>th</sup> International Conference on Gas Hydrates, ICGH 2014, Beijing, July 28-Aug 01.
- 2014: Session Chair for “Hydrates”, In 6<sup>th</sup> International Conference on Applied Energy, ICAE 2014, Taipei, May 31 - June 2.
- 2014: Scientific Committee Member, New Trends in Transport Phenomena, NTPP – 2014, Ottawa, Canada.
- 2013: Session Chair/Co-Chair, International Conference on Electrochemical Materials and Technologies for Clean Sustainable Energy, CSE 2013, Guangzhou, July 5-9.
- 2012: Local Organizing Committee Member, 11<sup>th</sup> International Symposium on Process Systems Engineering Conference, July 2012.

- 2012: Co-Guest Editor, 14<sup>th</sup> Asia Pacific Confederation of Chemical Engineering Congress Conference Proceedings, Singapore, February 21-24.
- 2012: Scientific/Technical Program Committee Member, 14<sup>th</sup> Asia Pacific Confederation of Chemical Engineering Congress, Singapore, February 21-24.
- 2011: Contributed to the primer, "Carbon Capture and Storage/Utilization Technology Primer: A Summary" for the National Climate Change Secretariat and National Research Foundation.
- 2008: Student Volunteer for the 6<sup>th</sup> International Conference on Gas Hydrates (ICGH 2008) held in Vancouver (July 2008).

## RESEARCH AREAS

- Gas Hydrates or clathrate hydrates
- Carbon dioxide capture
- Energy recovery from unconventional fuels
- Seawater desalination
- Storage and transport of fuels
- Optimization and parameter estimation

## RESEARCH HIGHLIGHTS

For details, visit: [http://cheed.nus.edu.sg/stf/chepl/3\\_p.html](http://cheed.nus.edu.sg/stf/chepl/3_p.html)

- Dr. Linga is listed amongst the **top 1%** of scientists in the field of "Engineering" by Essential Science Indicators of Thomson Reuters since May 2014.
- Our paper [[Chem Eng Sci](#) (2012) 68, 617-623] received "**Most Cited Paper**" award in 2015 from Chemical Engineering Science (top 1% among 3500+ publications since 2010).
- Our paper [[Int J Greenh Gas Control](#) (2010) 4 (4), 630-637] received "**Most Cited Paper**" award in 2015 from International Journal of Greenhouse Gas Control (top 2% among 1000+ publications since 2010).
- Our paper [[Energy](#) (2013) 50, 364-373] was highlighted by Elsevier in a virtual special issue on "Chemistry and Materials for Energy".
- Our paper [[Chem Eng Sci](#) (2007) 62, 4268-4275] received "**Most Cited Paper**" award in 2012 from Chemical Engineering Science for five year (2007 – 2012) period.
- **Citation Metrics** (updated on Sep 05, 2015)

|  | Scopus | Google Scholar |
|--|--------|----------------|
| Actives years in research (2006 – present)     |        | 9              |
| Number of Publications                         |        | 49             |
| Total Citations                                | 1365   | 1871           |
| h index  | 20     | 21             |
| Cites/paper ("in press" articles not included) | 29.7   | 40.7           |
| i100 index (papers ≥ 100 citations)            | 3      | 3              |
| i50 index (papers ≥ 50 citations)              | 10     | 13             |
| i10 index (papers ≥ 10 citations)              | 29     | 33             |

## LIST OF PUBLICATIONS (PEER-REVIEWED)

Scopus : <http://www.scopus.com/authid/detail.url?authorId=14035921700>

Google Scholar : <http://scholar.google.com.sg/citations?user=6NpSa1kAAAAJ&hl=en>

\*represents corresponding author

- (J51) Babu, P.; Ong, H. W. N.; Linga, P.\*, A systematic kinetic study to evaluate the effect of tetrahydrofuran on the clathrate process for pre-combustion capture of carbon dioxide. *Energy* **2015**, in press.
- (J50) Babu, P.; Paricaud, P.; Linga, P.\*, Experimental measurements and modeling of the dissociation conditions of semiclathrate hydrates of tetrabutyl ammonium nitrate and carbon dioxide. *Fluid Phase Equilibria* **2015**, in press [[DOI: 10.1016/j.fluid.2015.08.034](https://doi.org/10.1016/j.fluid.2015.08.034)].  
**[Invited submission for a special issue on "Gas Hydrates and Semiclathrate Hydrates"]**
- (J49) Chong, Z. R.; Chan, A. H. M.; Babu, P.; Yang, M.; Linga, P.\*, Influence of NaCl on methane hydrate formation and dissociation in porous media. *Journal of Natural Gas Science & Engineering* **2015**, in press [[DOI: 10.1016/j.jngse.2015.08.055](https://doi.org/10.1016/j.jngse.2015.08.055)].
- (J48) Lee, J.-M.; Cho, S.-J.; Lee, J.-D.\*; Linga, P.\*; Kang, K.-C.; Lee, J., New insights on the kinetics of methane hydrate formation in a stirred tank reactor coupled with in-situ Raman spectroscopy. *Energy Technology* **2015**, in press [[DOI: 10.1002/ente.201500066](https://doi.org/10.1002/ente.201500066)].
- (J47) Veluswamy, H. P.; Ang, W. J.; Zhao, D.; Linga, P.\*, Influence of cationic and non-ionic surfactants on the kinetics of mixed hydrogen/tetrahydrofuran hydrates. *Chemical Engineering Science* **2015**, 132, 186-199.
- (J46) Babu, P.; Linga, P.\*; Kumar, R.\*; Englezos, P.\*, A Review of the Hydrate Based Gas Separation (HBGS) Process for Carbon Dioxide Pre-Combustion Capture. *Energy* **2015**, 85, 261-279.
- (J45) Nambiar, A.; Babu, P.; Linga, P.\*, CO<sub>2</sub> capture using the clathrate hydrate process employing cellulose foam as a porous media. *Canadian Journal of Chemistry* **2015**, available online [[DOI: 10.1139/cjc-2014-0547](https://doi.org/10.1139/cjc-2014-0547)].  
**[Invited paper for a special issue dedicated to Dr. John Ripmeester of National Research Council Canada]**
- (J44) Chong, Z. R.; Yang, S. H. B.; Babu, P.; Linga, P.\*; Li, X.-S.\*, Review of natural gas hydrates as an energy resource: Prospects and Challenges. *Applied Energy* **2015**, available online [[DOI: 10.1016/j.apenergy.2014.12.061](https://doi.org/10.1016/j.apenergy.2014.12.061)].
- (J43) Veluswamy, H. P.; Chen, J. Y.; Linga, P.\*, Surfactant effect on the kinetics of mixed hydrogen/propane hydrate formation for hydrogen storage as clathrates. *Chemical Engineering Science* **2015**, 126, 488-499.
- (J42) Siangsai, A.; Rangsunwigit P.\*; Kitiyanan, B.; Kulapraphpanja, S.; Linga, P., Investigation on the Roles of Activated Carbon Particle Sizes on Methane Hydrate Formation and Dissociation. *Chemical Engineering Science* **2015**, 126, 383-389.
- (J41) Yang, S. H. B.; Babu, P.; Chua, S. F. S.; Linga, P.\*, Carbon Dioxide Hydrate Kinetics in Porous Media with and without Salts. *Applied Energy* **2015**, available online, [[10.1016/j.apenergy.2014.11.052](https://doi.org/10.1016/j.apenergy.2014.11.052)].
- (J40) Loh, M.\*; Too, J. L.; Falser, S.; Linga, P.; Khoo, B. C.; Palmer, A., Gas production from methane hydrates in a dual wellbore system. *Energy & Fuels* **2015**, 29 (1), 35-42.
- (J39) Veluswamy, H. P.; Yew, J. C.; Linga, P.\*, New hydrate phase equilibrium data for two binary gas mixtures of hydrogen and propane coupled with kinetic study. *Journal of Chemical & Engineering Data* **2015**, 60 (2), 228-137.

**[Invited paper for a special issue on gas hydrates, dedicated to Professor E. Dendy Sloan's 70<sup>th</sup> birthday]**

- (J38) Kumar, A.; Sakpal, T.; Linga, P.; Kumar, R.\*, Enhanced Carbon Dioxide Hydrate Formation Kinetics in a Fixed Bed Reactor Filled with Metallic Packing. *Chemical Engineering Science* **2015**, 122, 78-85.
- (J37) Babu, P.; Datta, S.; Kumar, R.; Linga, P.\*, Impact of experimental pressure and temperature on semiclathrate hydrate formation for pre-combustion capture of CO<sub>2</sub> using tetra-n-butyl ammonium nitrate. *Energy* **2014**, 78, 458-464.
- (J36) Kang, K. C.; Linga, P.; Park, K.-N.; Choi, S.-J.; Lee, J.-D.\*, Seawater desalination by gas hydrate process and removal characteristics of dissolved ions (Na<sup>+</sup>, K<sup>+</sup>, Mg<sup>2+</sup>, Ca<sup>2+</sup>, B<sup>3+</sup>, Cl<sup>-</sup>, SO<sub>4</sub><sup>2-</sup>). *Desalination* **2014**, 353, 84-90.
- (J35) Babu, P.; Kumar, R.; Linga, P.\*, Unusual behavior of propane as a co-guest during hydrate formation in silica sand: Potential application to seawater desalination and carbon dioxide capture. *Chemical Engineering Science* **2014**, 117, 342-351.
- (J34) Kumar, A.; Sakpal, T.; Linga, P.; Kumar, R.\*, Impact of Fly Ash Impurity on the Hydrate Based Gas Separation Process for Carbon Dioxide Capture from a Flue Gas Mixture. *Industrial & Engineering Chemistry Research* **2014**, 53 (23), 9849-9859.
- (J33) Babu, P.; Ho, C. Y.; Kumar, R.; Linga, P.\*, Enhanced kinetics for the clathrate process in a fixed bed reactor in the presence of liquid additives for pre-combustion carbon dioxide capture. *Energy* **2014**, 70, 664-673.
- (J32) Veluswamy, H. P.; Yang, T.; Linga, P.\*, Crystal growth of hydrogen/tetra-n-butylammonium bromide semiclathrates based on morphology study. *Crystal Growth & Design* **2014**, 14 (4), 1950-1960.
- (J31) Mekala, P.; Babu, P.; Sangwai, J.\*; Linga, P.\*, Formation and Dissociation Kinetics of Methane Hydrates in Seawater and Silica Sand. *Energy & Fuels* **2014**, 28 (4), 2708-2716.
- (J30) Babu, P.; Chin, W. I.; Kumar, R.; Linga, P.\*, Systematic evaluation of tetra-n-butyl ammonium bromide (TBAB) for carbon dioxide capture employing the clathrate process. *Industrial & Engineering Chemistry Research* **2014**, 53 (12), 4878-4887.
- (J29) Babu, P.; Yao, M.; Datta, S.; Kumar, R.; Linga, P.\*, Thermodynamic and kinetic verification of tetra-n-butyl ammonium nitrate (TBANO<sub>3</sub>) as a promoter for the clathrate process applicable to pre-combustion carbon dioxide capture. *Environmental Science & Technology* **2014**, 48 (6), 3550-3558.
- (J28) Veluswamy, H. P.; Kumar, R.\*; Linga, P.\*, Hydrogen storage in clathrate hydrates: Current state of the art and future directions. *Applied Energy* **2014**, 122, 112-132.  
**[Listed as a "Highly Cited Paper" by Essential Science Indicators of Thomson Reuters since September 2014 (Top 1% in Engineering in 2014); Listed as a "Hot Paper" by Essential Science Indicators (Top 0.1% in Engineering in 2013) of Thomson Reuters]**
- (J27) Veluswamy, H. P.; Chin, W. I.; Linga, P.\*, Clathrate hydrates for hydrogen storage: The impact of tetrahydrofuran, tetra-n-butylammonium bromide and cyclopentane as promoters on the macroscopic kinetics. *International Journal of Hydrogen Energy* **2014**, 39 (28), 16234-16243.

- (26) Babu, P.; Kumar, R.; Linga, P.\*, A new porous material to enhance the kinetics of clathrate process: Application to pre-combustion carbon dioxide capture. *Environmental Science & Technology* **2013**, 47 (22), 13191-13198.
- (J25) Ho, L. C.; Babu, P.; Kumar, R.; Linga, P.\*, HBGS (hydrate based gas separation) process for carbon dioxide capture employing an unstirred reactor with cyclopentane. *Energy* **2013**, 63, 252-259.
- (J24) Babu, P.; Kumar, R.; Linga, P.\*, Medium pressure hydrate based gas separation (HBGS) process for pre-combustion capture of carbon dioxide employing a novel fixed bed reactor. *International Journal of Greenhouse Gas Control* **2013**, 17, (5), 206-214.  
**[Listed as a "Highly Cited Paper" by Essential Science Indicators of Thomson Reuters since July 2014 (Top 1% in Engineering in 2013); Listed as a "Hot Paper" by Essential Science Indicators (Top 0.1% in Engineering in 2013) of Thomson Reuters in two issues]**
- (J23) Babu, P.; Yee, D.; Linga, P.\*; Palmer, A.; Khoo, B. C.; Tan, T. S.; Rangsunwigit, P., Morphology of methane hydrate formation in porous media. *Energy & Fuels* **2013**, 27, (6), 3364-3372.
- (J22) Lim, Y.-A.; Babu, P.; Kumar, R.; Linga, P.\*, Morphology of Carbon Dioxide–Hydrogen–Cyclopentane Hydrates with or without Sodium Dodecyl Sulfate. *Crystal Growth & Design* **2013**, 13, (5), 4587-4596.
- (J21) Babu, P.; Yang, T.; Veluswamy, H. P.; Kumar, R.; Linga, P.\*, Hydrate phase equilibrium of ternary gas mixtures containing carbon dioxide, hydrogen and propane. *Journal of Chemical Thermodynamics* **2013**, 61, 58-63.
- (J20) Daraboina, N.; Linga, P.\*, Experimental investigation of the effect of poly-N-vinyl pyrrolidone (PVP) on methane/propane clathrates using a new contact mode. *Chemical Engineering Science* **2013**, 93, 387-394.
- (J19) Veluswamy, H. P.; Linga, P.\*, Macroscopic Kinetics of hydrate formation of mixed hydrates of hydrogen/tetrahydrofuran for hydrogen storage. *International Journal of Hydrogen Energy* **2013**, 38, (11), 4587–4596  
**[Listed as a "Highly Cited Paper" by Essential Science Indicators of Thomson Reuters since November 2013 (Top 1% in Engineering in 2013)].**
- (J18) Babu, P.; Kumar, R.; Linga, P.\*, Pre-combustion capture of carbon dioxide in a fixed bed reactor using the clathrate hydrate process. *Energy* **2013**, 50, 364-373  
**[Highlighted by Elsevier in a virtual special issue on "Chemistry and Materials for Energy"; Listed as a "Highly Cited Paper" by Essential Science Indicators of Thomson Reuters since November 2013 (Top 1% in Engineering in 2013)].**
- (J17) Kumar, A.; Sakpal, T.; Linga, P.; Kumar, R.\*, Influence of contact medium and surfactants on carbon dioxide clathrate hydrate kinetics. *Fuel* **2013**, 105, (3), 664-671.  
**[Listed as a "Highly Cited Paper" by Essential Science Indicators since February 2014 (Top 1% in Engineering in 2013) by Thomson Reuters]**
- (J16) Loh, M.\*; Falser, S.; Babu, P.; Linga, P.; Palmer, A.; Tan, T. S., Dissociation of Fresh- And Seawater Hydrates along the Phase Boundaries between 2.3 and 17 MPa. *Energy & Fuels* **2012**, 26, (10), 6240-6246.

- (J15) Linga, P.; Daraboina, N.; Ripmeester, J. A.; Englezos, P.\*, Enhanced rate of gas hydrate formation in a fixed bed column filled with sand compared to a stirred vessel. *Chemical Engineering Science* **2012**, 68, (1), 617-623  
**["Most Cited Paper" (2010-2015) award by Chem. Eng. Sci. in 2015].**
- (J14) Daraboina, N.; Linga, P.; Ripmeester, J.; Walker, V. K.; Englezos, P.\*, Natural Gas Hydrate Formation and Decomposition in the Presence of Kinetic Inhibitors. 2. Stirred Reactor Experiments. *Energy & Fuels* **2011**, 25, (10), 4384-4391.
- (J13) Yoslim, J.; Linga, P.; Englezos, P.\*, Enhanced growth of methane – propane clathrate hydrate crystals with sodium dodecyl sulfate, sodium tetradecyl sulfate, and sodium hexadecyl sulfate surfactants. *Journal of Crystal Growth* **2010**, 313, (1), 68-80.
- (J12) Linga, P.; Kumar, R.; Lee, J. D.; Ripmeester, J. A.; Englezos, P.\*, A new large scale apparatus to enhance the rate of gas hydrate formation: application to capture of carbon dioxide. *International Journal of Greenhouse Gas Control* **2010**, 4, (4), 630-637  
**["Most Cited Paper" (2007-2012) award by Int. J. Greenh. Gas Control; Listed as a "Highly Cited Paper" by Essential Science Indicators of Thomson Reuters since March 2015 (Top 1% in Engineering in 2010); Listed as an "h5 core" article by Google Scholar Metrics in 2014].**
- (J11) Haligva, C.; Linga, P.; Ripmeester, J. A.; Englezos, P.\*, Recovery of Methane from a Variable-Volume Bed of Silica Sand/Hydrate by Depressurization. *Energy and Fuels* **2010**, 24, (5), 2947-2955.
- (J10) Lee, H. J.; Lee, J. D.; Linga, P.; Englezos, P.; Kim, Y. S.; Lee, M. S.; Kim, Y. D.\*, Gas hydrate formation process for pre-combustion capture of carbon dioxide. *Energy* **2010**, 35, (6), 2729-2733.  
**[Listed as a "Highly Cited Paper" by Essential Science Indicators of Thomson Reuters since February 2014 (Top 1% in Engineering in 2010)]**
- (J9) Adeyemo, A.; Kumar, R.; Linga, P.; Ripmeester, J.; Englezos, P.\*, Capture of CO<sub>2</sub> from flue or fuel gas mixtures by clathrate crystallization in a silica gel column. *International Journal of Greenhouse Gas Control* **2010**, 4, (3), 478-485.
- (J8) Linga, P.; Haligva, C.; Nam, S.-C.; Ripmeester, J. A.; Englezos, P.\*, Recovery of methane from hydrate formed in a variable volume bed of silica sand particles. *Energy & Fuels* **2009**, 23, (11), 5508–5516.
- (J7) Linga, P.; Haligva, C.; Nam, S.-C.; Ripmeester, J. A.; Englezos, P.\*, Gas hydrate formation in a variable volume bed of silica sand particles. *Energy & Fuels* **2009**, 23, (11), 5496–5507.
- (J6) Kumar, R.; Linga, P.; Ripmeester, J., A.; Englezos, P.\*, A two-stage clathrate hydrate/membrane process for pre-combustion capture of carbon dioxide and hydrogen. *Journal of Environmental Engineering* **2009**, 135, (6), 411-417  
**[Listed as an "h5 core" article by Google Scholar Metrics for three consecutive years of 2012, 2013 & 2014].**
- (J5) Kumar, R.; Linga, P.; Moudrakovski, I.; Ripmeester, J. A.; Englezos, P.\*, Structure and kinetics of gas hydrates from methane/ethane/propane mixtures relevant to the design of natural gas hydrate storage and transport facilities. *AIChE Journal* **2008**, 54, (8), 2132-2144  
**[Listed as an "h5 core" article by Google Scholar Metrics in 2013].**

- (J4) Linga, P.; Adeyemo, A.; Englezos, P.\*, Medium-Pressure Clathrate Hydrate/Membrane Hybrid Process for Postcombustion Capture of Carbon Dioxide. *Environmental Science & Technology* **2008**, 42, (1), 315-320.
- (J3) Linga, P.; Kumar, R.; Englezos, P.\*, The clathrate hydrate process for post and pre-combustion capture of carbon dioxide. *Journal of Hazardous Materials* **2007**, 149, (3), 625-629.
- [Listed as a “Highly Cited Paper” by Essential Science Indicators of Thomson Reuters since July 2011 (Top 1% in Engineering in 2007); Listed as an “h5 core” article by Google Scholar Metrics in 2012].**
- (J2) Linga, P.; Kumar, R.; Englezos, P.\*, Gas hydrate formation from hydrogen/carbon dioxide and nitrogen/carbon dioxide gas mixtures. *Chemical Engineering Science* **2007**, 62, (16), 4268-4276.
- [“Most Cited Paper” (2007-2012) award by Chem. Eng. Sci.; Listed as an “h5 core” article by Google Scholar Metrics in 2012].**
- (J1) Linga, P.; Al-Saifi, N.; Englezos, P.\*, Comparison of the Luus-Jaakola optimization and Gauss-Newton methods for parameter estimation in ordinary differential equation models. *Industrial & Engineering Chemistry Research* **2006**, 45, (13), 4716-4725.

#### LIST OF CONFERENCES/SEMINARS

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Key facts: Keynote Talks (KT): 3; Invited Talks (IT): 15; Invited Seminars (IS): 15; Conference Proceedings (CP): 17; Conference Talks (CT): 12

- (KT3) **Keynote Speaker** in 5<sup>th</sup> Sriwijaya International Seminar on Energy and Environmental Science and Technology, SISEEST 2014, Palembang, Indonesia, September 10, 2014.
- (KT2) **Keynote Speaker** in International Conference on Electrochemical Materials and Technologies for Clean Sustainable Energy, CSE 2013, Guangzhou, China, July 9, 2013.
- (KT1) **Keynote Speaker** in National Level Seminar on Natural Gas Hydrates, Madurai, India, October 20, 2012.
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- (IT15) **Invited Speaker** in American Institute of Chemical Engineers (AIChE) Annual Meeting, Salt Lake City USA, November 8-13, 2015.
- (IT14) **Invited Speaker** in Canadian Society of Chemical Engineering (CSCHE) Conference, Calgary Canada, October 4-7, 2015.
- (IT13) **Invited Speaker** in Sustainability, Environment & Energy Research (SEER), NUS Singapore, August 27, 2015.
- (IT12) **Invited Speaker** in Technology Sharing Session for Oil & Gas Industry, Singapore, May 19, 2015.
- (IT11) **Invited Speaker** in 21<sup>st</sup> PPC Symposium on Petroleum, Petrochemicals, and Polymers, Bangkok, April 21, 2015.
- (IT10) **Invited Speaker** in 9<sup>th</sup> International Workshop on Methane Hydrates Research & Development, Hyderabad, India, November 11, 2014.
- (IT9) **Invited Speaker** in 14<sup>th</sup> CHEMECA conference, Perth, Australia, October 1, 2014.
- (IT8) **Invited Speaker** in 20<sup>th</sup> PPC Symposium on Petroleum, Petrochemicals, and Polymers, Bangkok, April 22, 2014.
- (IT7) **Invited Speaker** in Chemcon Conference, Mumbai, India, December 29, 2013.



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- (IT6) **Invited Speaker** in 19th PPC Symposium on Petroleum, Petrochemicals, and Polymers, Bangkok, April 21, 2013.
- (IT5) **Invited Speaker** in National Level Seminar on Natural Gas Hydrates, Madurai, India, October 20, 2012.
- (IT4) **Invited Speaker** in International Workshop on Natural Gas Hydrates - Exploration and Production, IIT Madras: Madras, India, August 9, 2012.
- (IT3) **Invited Speaker** in 14th Asia Pacific Confederation of Chemical Engineering Conference Singapore, February 23, 2012.
- (IT2) **Invited Speaker** in International Symposium on Gas Hydrates and its Applications, Ulsan City, Korea, May 15, 2009.
- (IT1) **Invited Speaker** in International Conference on Sustainable Petroleum Development, Beijing, China, May 8, 2007.
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- (IS15) **Invited Seminar**, Department of Chemical Engineering, Rice University, Houston, November 13, 2015.
- (IS14) **Invited Seminar**, Department of Petroleum Engineering, University of Tulsa, Tulsa, November 12, 2015.
- (IS13) **Invited Seminar**, Department of Ocean Engineering, Indian Institute of Technology, Madras, July 23, 2015.
- (IS12) **Invited Seminar**, Center for Hydrate Research, Colorado School of Mines, Golden, June 22, 2015.
- (IS11) **Invited Seminar**, Joint workshop on Energy by NUS-IITB, Singapore, February 25, 2015.
- (IS10) **Invited Seminar**, National Geophysical Research Institute (CSIR-NGRI), Hyderabad, February 19, 2015.
- (IS9) **Invited Seminar**, Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad, February 19, 2015.
- (IS8) **Invited Seminar**, Chinese Academy of Sciences – Institute of Process Engineering (IPE), Beijing, July 31, 2014.
- (IS7) **Invited Seminar**, Korea Institute of Industrial Technology (KITECH), South Korea, May 22, 2014.
- (IS6) **Invited Seminar**, Korea Advanced Institute of Science and Technology (KAIST), South Korea, May 19, 2014.
- (IS5) **Invited Seminar**, National Chemical Laboratory-Pune, India, December 31, 2013.
- (IS4) **Invited Seminar**, The University of British Columbia, Vancouver, Canada, 2013.
- (IS3) **Invited Seminar**, South China University of Science and Technology, Guangzhou, China, July 11, 2013.
- (IS2) **Invited Seminar**, Center for Gas Hydrate Research, Guangzhou Institute of Energy Conversion - CAS, Guangzhou, China, July 10, 2013.
- (IS1) **Invited Seminar**, Petroleum and Petrochemical College, Chulalongkorn University, Bangkok, Thailand, January 21, 2013.
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- (CP17) Veluswamy, H.P. \*; Yang, T.; Linga, P.; Morphology study on hydrogen/tetrabutylammonium bromide semiclathrate crystals. In 8th International Conference on Gas Hydrates, Beijing, 2014.

- (CP16) Veluswamy, H.P.\*; Yew, J.C.; Linga, P.; Macroscopic kinetics of mixed hydrogen hydrate formation with propane as a promoter. In 8th International Conference on Gas Hydrates, Beijing, 2014.
- (CP15) Daraboina, N.\*; Linga, P.; Ripmeester, J.; Walker, V.K.; Englezos, P.; The unusual behavior of methane/ethane/propane hydrate crystals in the presence of inhibitor at low pressure. In 8th International Conference on Gas Hydrates, Beijing, 2014.
- (CP14) Loh, M.\*; Too, J. L.; Falser, S.; Linga, P.; Khoo, B.C.; Palmer, A. C.; Gas production from methane hydrates in a dual wellbore system. In 8th International Conference on Gas Hydrates, Beijing, 2014.
- (CP13) Too, J. L.\*; Loh, M.; Linga, P.; Khoo, B.C.; Palmer, A. C.; Hydraulic fracturing of hydrates to increase the production of methane hydrates. In 8th International Conference on Gas Hydrates, Beijing, 2014.
- (CP12) Mekala, P.; Babu, P.\*; Sangwai, J.S.; Linga, P., Methane hydrate formation and dissociation in seawater and silica sand. In 8th International Conference on Gas Hydrates, Beijing, 2014.
- (CP11) Babu, P.\*; Ho, CY.; Kumar, R.; Linga, P., Effect of liquid promoters on hydrate formation in a fixed bed column with silica sand. In 8th International Conference on Gas Hydrates, Beijing, 2014.
- (CP10) Babu, P.\*; Yao, M.; Datta, S.; Kumar, R.; Linga, P., Impact of tetra-n-butyl ammonium nitrate (TBANO<sub>3</sub>) on hydrate formation from fuel gas mixture. In 8th International Conference on Gas Hydrates, Beijing, 2014.
- (CP9) Kumar, A.\*; Linga, P.; Kumar, R.; Carbon dioxide capture from a flue gas and fuel mixture by hydrate formation in silica gel and silica sand media. In 8<sup>th</sup> International Conference on Gas Hydrates, Beijing, 2014.
- (CP8) Babu, P.\*; Kumar, R.; Linga, P., Fixed bed reactor design: An opportunity to apply the clathrate process for carbon dioxide capture and seawater desalination. In 8<sup>th</sup> International Conference on Gas Hydrates, Beijing, 2014.
- (CP7) Babu, P.; Yang, S. H. B.; Dasgupta, S.; Linga, P.\* , Methane Production from Natural Gas Hydrates via Carbon Dioxide Fixation. In 6<sup>th</sup> International Conference on Applied Energy, Taipei, 2014. *Proceedings published in Energy Procedia*
- (CP6) Babu, P.; Chin, W. I.; Kumar, R.; Linga, P.\* , The impact of pressure and temperature on tetra-n-butyl ammonium bromide semi-clathrate process for carbon dioxide capture. In 6<sup>th</sup> International Conference on Applied Energy, Taipei, 2014. *Proceedings published in Energy Procedia*
- (CP5) Daraboina, N.; Linga, P.; Ripmeester, J.; Englezos, P., Experimental investigation of the effect of poly-N-vinyl pyrrolidone on methane/propane clathrate in the presence of silica sand. In 7th International Conference on Gas Hydrates, Edinburgh, 2011.
- (CP4) Linga, P.\*; Ripmeester, J. A.; Englezos, P., Assessment of the medium-pressure clathrate hydrate process for CO<sub>2</sub> capture in a new apparatus. In 6th International Conference on Gas Hydrates, Vancouver, 2008.
- (CP3) Nam, S.-C.; Linga, P.\*; Haligva, C.; Ripmeester, J. A.; Englezos, P., Kinetics of hydrate formation and decomposition of methane in porous media. In 6th International Conference on Gas Hydrates, Vancouver, 2008.
- (CP2) Kumar, R.; Linga, P.\*; Englezos, P., Pre and Post Combustion Capture of Carbon dioxide via Hydrate Crystallization. In EIC Climate Change Conference, Ottawa, 2006.
- (CP1) Linga, P.; Kumar, R.; Englezos, P.\* , The clathrate hydrate process for post and pre combustion capture of carbon dioxide. In Protection and Restoration of the Environment VIII, Chania, 2006.

- (CT12) Babu, P.\*; Zheng, J.; Linga, P., Effect of tetrahydrofuran on the clathrate process for pre-combustion capture of carbon dioxide. In 65<sup>th</sup> CSChE, Calgary, October 4-7, 2015.
- (CT11) Babu, P.; Linga, P.\* , Potential for Semiclathrates for CO<sub>2</sub> capture. In 19<sup>th</sup> Symposium on Thermophysical Properties, Boulder, 2015.
- (CT10) Babu, P.; Kumar, R.; Linga, P.\* , Semiclathrates for CO<sub>2</sub> capture. In AIChE Annual Meeting, Atlanta, 2014.
- (CT9) Mekala, P.; Babu, P.; Sangwai, J.\*; Linga, P., Experimental Investigations on Natural Gas Recovery from Gas Hydrates using Thermal Stimulation. In International Symposium on Fusion Technology in Oil and Gas Development, South Korea, January 2014.
- (CT8) Babu, P.; Kumar, R.; Linga, P.\* , Progress on the hydrate based gas separation (HBGS) process for carbon dioxide capture. In AIChE Annual Meeting, San Francisco, 2013.
- (CT7) Babu, P.; Yee, D.; Linga, P.\*; Palmer, A.; Khoo, B. C.; Tan, T. S.; Rangsunwigit, P., Transient Hydrate Formation/Dissociation of Methane Hydrates in Porous Media at Hydrate Stable Conditions. In 2013 AIChE Annual Meeting, San Francisco, 2013.
- (CT6) Babu, P.; Linga, P.\* , The clathrate process for pre-combustion capture of carbon dioxide employing a novel fixed bed reactor. In 2012 AIChE Annual Meeting, Pittsburgh, 2012.
- (CT5) Linga, P.\*; Haligva, C.; Ripmeester, J. A.; Englezos, P., Enhanced rate of hydrate formation in a silica sand matrix compared to a stirred vessel. In 237<sup>th</sup> ACS National Meeting & Exposition, Fuel Chemistry Division, Salt Lake City, 2009.
- (CT4) Linga, P.; Kumar, R.\*; Ripmeester, J. A.; Englezos, P., Progress on the gas hydrate process for CO<sub>2</sub>/N<sub>2</sub> and CO<sub>2</sub>/H<sub>2</sub> separation using a large scale apparatus. In 237<sup>th</sup> ACS National Meeting & Exposition, Fuel Chemistry Division, Salt Lake City, 2009.
- (CT3) Kumar, R.\*; Linga, P.; Ripmeester, J. A.; Englezos, P., Capture of carbon dioxide through clathrate hydrate crystallization In 8<sup>th</sup> World Congress of Chemical Engineering: Incorporating the 59<sup>th</sup> Canadian Chemical Engineering Conference and the 24<sup>th</sup> Inter American Congress of Chemical Engineering, Montreal, 2009; p 512.
- (CT2) Kumar, R.\*; Linga, P.; Adeyemo, A.; Ripmeester, J. A.; Englezos, P., Post-combustion capture of carbon dioxide by clathrate hydrate crystallization. In CHEMRAWN-XVII and ICCDU-IX Conference on Greenhouse Gases Mitigation and Utilization, Kingston, Canada, 2007.
- (CT1) Linga, P.; Kumar, R.\*; Englezos, P., Pre and post-combustion capture of carbon dioxide by clathrate hydrate crystallization. In CSChE Conference, Sherbrooke, 2006.

## GRADUATE STUDENTS SUPERVISED

- Ponnivalavan BABU, PhD, National University of Singapore (2010 – 2014, graduated)
- Hari Prakash VELUSWAMY, PhD, National University of Singapore (2011-2015, submitted)
- Jun Lin TOO, PhD, National University of Singapore (2013-2016, expected)
- Zheng Rong CHONG, PhD, National University of Singapore (2014-2017, expected)
- Junjie ZHENG, PhD, National University of Singapore (2014 – 2018, expected)
- She Hern Bryan YANG, MEng, National University of Singapore, graduated in 2014
- Abhishek Pradeep NAMBIAR, MSc (project), National University of Singapore (2014)

### Visiting Scholars

- Dr. Mingjun Yang, Visiting Scientist for 1 year, Associate Professor in Dalian University of Technology, China (Jan-Dec 2015)
- Atsadawuth SIANGSAI, PhD, Visiting Scholar for 3 months, Chulalongkorn University, graduated in May 2015

- Prathyusha MEKALA, PhD, Visiting scholar for 3 months (Jun-Aug 2013), Indian Institute of Technology Madras, graduated in 2014

### UNDERGRADUATE STUDENTS SUPERVISED (RESEARCH PROJECTS)

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*Key facts: Undergraduates have contributed to 15 publications (first author: 7; co-author: 8)*

1. Arjun MULLOTH, Final Year Project (AY2015-16)
2. Sharad KUMAR, Final Year Project (AY2015-16)
3. HONG Qi Wei, Final Year Project (AY2015-16)
4. NG Jing Heng, Final Year Project (AY2015-16)
5. Girish Anand PUJAR, Final Year Project (AY2015-16)
6. LEE Yean Kuan, Final Year Project (AY2015-16)
7. LU Li, Final Year Project (AY2015-16)
8. WONG Alison Jia Hui, Final Year Project (AY2015-16)
9. ANG Wei Jun, Final Year Project (AY 2014-15), *Co-first author in Veluswamy et al. CHEM ENG SCI (2015), in press*
10. CHAN Hui Min Adeline, Final Year Project (AY 2014-15), *Second author in Chong et al. J NAT GAS SCI ENG, in press.*
11. Stuti DATTA, Final Year Project (AY 2014-15)
12. ANG Chek Keng, Final Year Project (AY 2014-15)
13. ONG Hong Wen Nelson, Final Year Project (AY 2014-15)
14. Geoffrey TJIUPEK, Final Year Project (AY 2014-15)
15. Ganank Atulkumar SRIVASTAVA, Final Year Project (AY 2014-15)
16. CHEN Jian Yu, Final Year Project (AY 2013-14), *Co-author in Veluswamy et al. CHEM ENG SCI (2015), 126, 488-499.*
17. Sam Fu Sheng CHUA, Final Year Project (AY 2013-14), *Co-author in Yang et al. APPLIED ENERGY (2014), in press.*
18. YANG Ting, Final Year Project (AY 2013-14), *Co-first author in Veluswamy et al. CRYST GROWTH DES (2014), 14 (4), 1950-1960.*
19. TEO Siang Ling Grace, Final Year Project (AY 2013-14)
20. Wincent Marciono MAK, Final Year Project (AY 2013-14)
21. HO Chie Yin, Final Year Project (AY 2013-14), *Co-first author in Babu et al. ENERGY (2014), 70, 664-673.*
22. YEW Jin Chaw, Final Year Project (AY 2013-14), *Co-author in Veluswamy et al. J CHEM ENG DATA (2015), 60, 228-237.*
23. CHIN Weng Inn, Final Year Project (AY 2013-14), *Co-first author in Babu et al. IND ENG CHEM RES (2014), 53 (12), 4878-4887; co-author in Veluswamy et al. INT J HYDROGEN ENERG (2014) 39 (28), 16234-16243.*
24. Stuti DATTA, UROP Project (AY 2013-14), *Co-author in Babu et al. ENVIRON SCI TECHNOL (2014), 48 (6), 3550-3558; co-author in Babu et al. ENERGY (2014) 78, 458-464.*
25. LIM Hanbin, Final Year Project (AY 2012-13)
26. HO Leong Chuan, Final Year Project (AY 2012-13), *Co-first author in Ho et al. ENERGY (2013), 63, 252-259.*
27. ONG Sze Sian, Final Year Project (AY 2012-13)
28. XU Kuo, Final Year Project (AY 2012-13)
29. LIM Yu An, Final Year Project (AY 2012-13), *Co-first author in Lim et al. CRYST GROWTH DES (2013), 13, (5), 4587-4596.*

30. SIEW Keng Loong Marcus, Final Year Project (AY 2012-13)
31. Sajawal ZAHID, Final Year Project (AY 2012-13)
32. YAO Minghuang, Final Year Project (AY 2012-13), *Co-author in Babu et al. ENVIRON SCI TECHNOL (2014), 48 (6), 3550-3558.*
33. YANG Ting, UROP Project (AY 2012-13), *Co-author in Babu et al. J CHEM THERMODYN (2013), 61, 58-63.*
34. LEONG Wei Quan Edmund, UROP Project (AY 2012-13)
35. Stella TAN Yun Hui, Final Year Project (AY 2011-12)
36. Den Syahril Bin Mohamed ISMAIL, Final Year Project (AY 2011-12)
37. Jianting WONG, Final Year Project (AY 2011-12)
38. NG Yong Kuan, Final Year Project (AY 2011-12)
39. HAO Yi, Final Year Project (AY 2011-12)
40. NG Jin Hin, Final Year Project (AY 2011-12)

## RESEARCH GRANTS

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*Key facts: Secured research funds to the tune of S\$7.2 million (USD\$5.2 million)*

- 2015** LNG Cold Energy Utilization to Desalinate Seawater Employing the Hydrate Based Desalination (HBD) Process, BG Group, S\$120,000, Principal Investigator (2015.11 to 2018.10)
- 2015** LNG Cold Energy Utilization to Desalinate Seawater Employing the Hydrate Based Desalination (HBD) Process, Energy Market Authority Office, National Research Foundation, S\$1.37 million, Principal Investigator (2015.08 to 2018.07)
- 2015** Energy minimization at the SLNG regasification terminal: Boil-off gas management and process integration, Energy Market Authority Office, National Research Foundation, S\$1.08 million, Co-Principal Investigator (2015.08 to 2018.07)
- 2014** Natural Gas Center: Preparing Singapore for the emerging global natural gas economy, National University of Singapore, University Strategic Funding, S\$3.97 million, Co-Principal Investigator (2014.09 to 2017.08)
- 2014** Methane production from natural gas hydrates via carbon dioxide fixation, National University of Singapore, Faculty Strategic Funding, S\$233,642, Principal Investigator (2014.04 to 2016.03)
- 2013** CO<sub>2</sub> Utilization by catalytic hydrogenation with solar hydrogen: from molecules to reactors, National University of Singapore, S\$38,000, Co-Principal Investigator (2013.05 to 2014.04)
- 2013** CO<sub>2</sub> Sequestration and CH<sub>4</sub> production from naturally occurring hydrate deposits, MOE TIER 1, S\$173,903, Principal Investigator (2013.03 to 2016.02)
- 2012** Production and site investigation of natural gas hydrates, CORE at the National University of Singapore, S\$150,000, Co-Principal Investigator (2012.02 to 2015.01)
- 2010** Pre-combustion capture of carbon dioxide based on gas hydrate formation, MOE TIER 1, S\$179,937, Principal Investigator (2010.08 to 2013.07)

## RESEARCH COLLABORATORS

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- Professor Peter Englezos (The University of British Columbia, Canada)
- Professor S Farooq (National University of Singapore, Singapore)
- Professor I A Karimi (National University of Singapore, Singapore)
- Professor Boo Cheong Khoo (National University of Singapore, Singapore)

- Dr. Santi Kulprathipanja (UOP, Des Plaines USA)
- Dr. Rajnish Kumar (National Chemical Laboratory, Pune India)
- Dr. Judong Lee (Korea Institute of Industrial Technology, Busan Korea)
- Professor Xiao-Sen Li (Guangzhou Institute of Energy Conversion, China)
- Professor Andrew Palmer (National University of Singapore, Singapore)
- Associate Professor Patrice Paricaud (ENSTA ParisTech, France)
- Professor Pramoch Rangsunvigit (Chulalongkorn University, Thailand)
- Dr. John Ripmeester (National Research Council Canada)
- Professor Jitendra S. Sangwai (Indian Institute of Technology Madras India)
- Professor Thiam Soon Tan (Singapore Institute of Technology, Singapore)
- Professor Mingjun Yang (Dalian University of Technology, China)
- Professor Virginia Walker (Queens University, Canada)

## REFeree IN JOURNALS

*Key facts: Peer reviewer for 25+ international journals in Engineering*

|  |   |
|--|---|
| ACS Sustainable Chemistry & Engineering      | International Journal of Greenhouse Gas Control |
| AIChE Journal                                | International Journal of Heat and Mass Transfer |
| Applied Energy                               | International Journal of Hydrogen Energy        |
| Asia Pacific Journal of Chemical Engineering | Ionics  |
| Chemical Engineering Science                 | Journal of Chemical and Engineering Data        |
| Crystal Growth & Design                      | Journal of Crystal Growth                       |
| Energy                                       | Journal of Natural Gas Science and Engineering  |
| Energy & Environmental Science               | Journal of Petroleum Science and Engineering    |
| Energy & Fuels                               | Journal of Physical Chemistry                   |
| Energy Technology                            | Korean Journal of Chemical Engineering          |
| Environmental Science & Technology           | Langmuir  |
| Fluid Phase Equilibria                       | Material Chemistry and Physics                  |
| Fuel   | Oil & Gas Journal                               |
| Industrial & Engineering Chemistry Research  | Scientific Reports                              |

## PROFESSIONAL AFFILIATIONS & INTERESTS

- Member of American Chemical Society (ACS), AIChE & Canadian Society of Chemical Engineers (CSCHE)
- Volunteer in a graduate student orientation program held in 2004
- Elected as General Secretary (Maintenance) in a hostel (Strength: 450 students) during the Master's degree
- Elected President of the Chemical Engineering Association in the 4<sup>th</sup> year during Bachelor's degree (Strength: 67 students)

## COMPUTING SYSTEMS, TRAINING & LANGUAGES

- Hardware: Fieldpoint & Fieldbus (NI), digital & analog control valves, NI DAQ, high pressure pumps & high pressure transmitters, GC, SEM/EDX

- Programming Languages: FORTRAN, Visual Basic, Pascal, COBOL, MATLAB
- Software Packages: MS Office, Visio, LABVIEW 8.1, ASPEN Plus, HYSYS, CSMGem
- Trained in safe work procedures, risk assessment studies, Workplace Hazardous Materials Information System (WHMIS) and Hazard Operability (HAZOP) analysis
- Fluent in English, Tamil, Telugu & Hindi