2018 ANNUAL REPORT

Linga Lab@NUS

Department of Chemical and Biomolecular Engineering

NUS National University of Singapore | Engineering

Linga Lab

ABOUT US

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Follow us:

Praveen Linga

Praveen Linga is the Dean's Chair Associate Professor in the Department of Chemical and Biomolecular Engineering at NUS. He is the co-lead for natural gas research in the centre for energy research & technology (CERT) at the Faculty of Engineering, NUS. He serves as a subject editor in Applied Energy and associate editor in the Journal of Natural Gas Science and Engineering. He is also a visiting professor of Guangzhou Institute of Energy Conversion, Chinese Academy of Sciences.

His research interests are in the areas of clathrate (gas) hydrates, storage and transport of fuels, carbon dioxide capture, storage & utilization (CCS & U), seawater desalination, recovery of energy and district and data centre cooling. His research group at NUS particularly focuses on enhancing the kinetics of hydrate formation for several applications of interest by developing novel reactor designs, experimental methods and techniques. Up to date, he has published more than 92 research articles and delivered more than 76 keynote/ invited talks and seminars.

OUR PEOPLE

Dr Li HUANG
Visiting Scientist

Dr Ponnivalavan BABU
Research Fellow

Dr Asheesh KUMAR
Research Fellow

Dr Hari Prakash VELUSWAMY
Research Fellow

Dr Zhongjin HE
Research Fellow

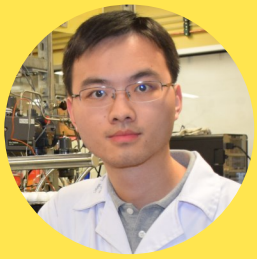
Dr Maninder KHURANA
Research Fellow

Dr Tianbiao HE
Research Fellow

Dr Jun Lin TOO
Research Fellow

Dr Zheng Rong CHONG
Research Fellow

Dr Gaurav BHATTACHARJEE
Research Fellow



Dr Junjie ZHENG
Research Fellow

Mr Abhishek NAMBIAR
Research Engineer

Mr Zhenyuan YIN
PhD Student

Mr Gaurav PANDEY
PhD Student

Mr Niranjan Kumar LOGANATHAN
Master's Student

Miss Hyunho KIM
Visiting Student

Mr Jia-nan ZHENG
Visiting Student

Mdm Ai Peng Teo
Senior Lab Technologist

Mr Jian Siong LEOW
Lab Technologist

What's in

ENERGY STORAGE

Statistics

No. of Publications	: 4
No. of Conference Presentations	: 3
No. of Patents filed	: 1

Solidified Natural Gas (SNG) Technology

SNG technology provides a viable alternative to store natural gas in molecular form by locking them in clathrate cages formed by water. A paradigm shift to move away from sI hydrates is needed to realize the potential of SNG (Solidified Natural Gas) technology for large scale storage systems for natural gas. The presence of a promoter that can enhance both thermodynamic and kinetic performance will enable the development of a low cost, energy efficient SNG technology based on clathrate hydrates for natural gas storage. Added benefits of SNG include being the safest mode of NG storage compared to any available conventional modes of NG storage. It is also easy to recover the natural gas and there is practically zero energy loss during the storage and recovery using SNG technology. Recently, we reported extremely fast hydrate formation kinetics with significant methane uptake even in presence of saline water and seawater. Direct use of seawater makes SNG technology practically and economically feasible as seawater is the most abundantly available resource and well-suited for large-scale methane storage needs and for the eventual commercialization of SNG technology. On 4th December 2018, we have filed a patent for the innovative reactor design to produce hydrate pellets vide SNG technology.

Prof. Praveen Linga and Dr. Asheesh Kumar holding the SNG pellet

Dr Hari Prakash VELUSWAMY
Research Fellow

Specializes in experimental studies on the kinetics, and morphology of gas hydrates

Dr Asheesh KUMAR
Research Fellow

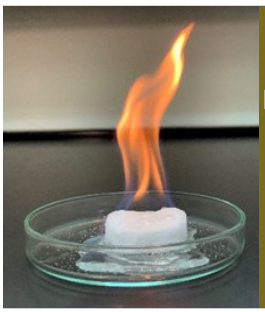
Specializes in high pressure micro-differential scanning calorimeter (DSC) & In-situ Raman Spectroscopy

Dr. Maninder KHURANA
Research Fellow

Specializes in process design & systems integration.

Dr Gaurav Bhattacharjee
Research Fellow

Specializes in gas hydrate kinetic studies, reactor design and energy recovery from hydrates.



Burning SNG pellet synthesized at Linga Lab

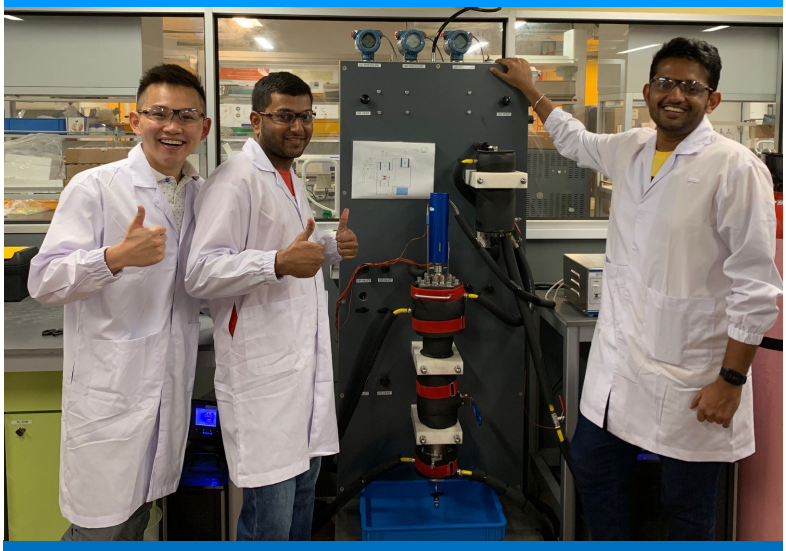
DESALINATION

Statistics

No. of Publication	: 2
No. of Conference Presentation	: 4
No. of Patent	: 1

HyDesal (Hydrate based Desalination) Process

Hydrate based desalination (HyDesal) process was proposed since 1960s as a potential technology for desalination. Although research in both academics and industrial scale has been made since then, this process has not been successfully commercialized. The major challenges that impede the deployment of the HyDesal process are: slow kinetics of hydrate formation, crystal separation from concentrated brine and the cold energy required for the process. Our team has developed innovative novel prototype designs for HyDesal process and Priority Patent Filing has been completed. With this prototype, we have achieved 43% water recovery in 1 hr. In 2018, the team has worked on process integration of LNG regasification and HyDesal process (ColdEn-HyDesal). The specific energy consumption of the integrated process was found to be 0.84 kWh/m^3, which is superior to the existing desalination technology. We are further exploring the economic feasibility of HyDesal process.



HyDesal team with our HyDesal Prototype. From left: Derrick Chong, Ponnivalavan Babu and Abhishek Nambiar.

Dr Ponnivalavan BABU
Research Fellow

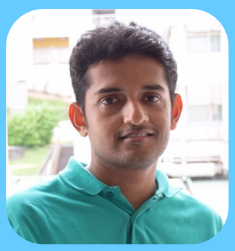
Specializes in experimental studies on hydrate based technology

Dr Tianbiao HE
Research Fellow

Specializes in HEN optimization and process integration

Dr Z.R. Chong (Derrick)
Research Fellow

Specializes in experimental investigations and economic analysis of hydrate technology



Mr Abhishek NAMBIAR
Research Engineer

Specializes in experimental studies on HyDesal

Dr Babu fixing hydrate crystal scrappers on the prototype

ENERGY RECOVERY

Statistics

No. of Publications : 6

No. of Conference Presentations : 6

Recovering energy from CH_4-hydrate bearing sediments (MHBS)

One key focus in Linga Lab is to investigate the technical feasibility and economic viability of recovering CH_4 from methane hydrate-bearing sediment (MHBS). The studies carried out in our lab include both experimental investigations and numerical simulations.

The kinetic behavior of hydrate formation and dissociation in sandy media is studied in high-pressure reactors of various sizes, i.e. 1.0 L, 3.0 L and 5.0 L. The high-quality experimental data is used to analyze the dynamic behavior and as the ground-truth for the numerical simulation. Experiments using different production methods, e.g. thermal stimulation, depressurization, etc. and different wellbore design are conducted to compare their efficiency. TOUGH+Hydrate v1.5 is the state-of the-art numerical simulator that is employed in our lab to investigate the coupled behavior of heat and fluid flow, the kinetics of hydrate and to derive the fundamental thermophysical properties of MHBS. The numerical simulation are validated against the experimental data to derive the spatial information of various phases, including gas, aqueous and hydrate in the reactor.

Mr Zhenyuan YIN

IPP Ph.D. Candidate

Specializes in numerical simulation of hydrate behavior and production from laboratory apparatus

Dr Li HUANG

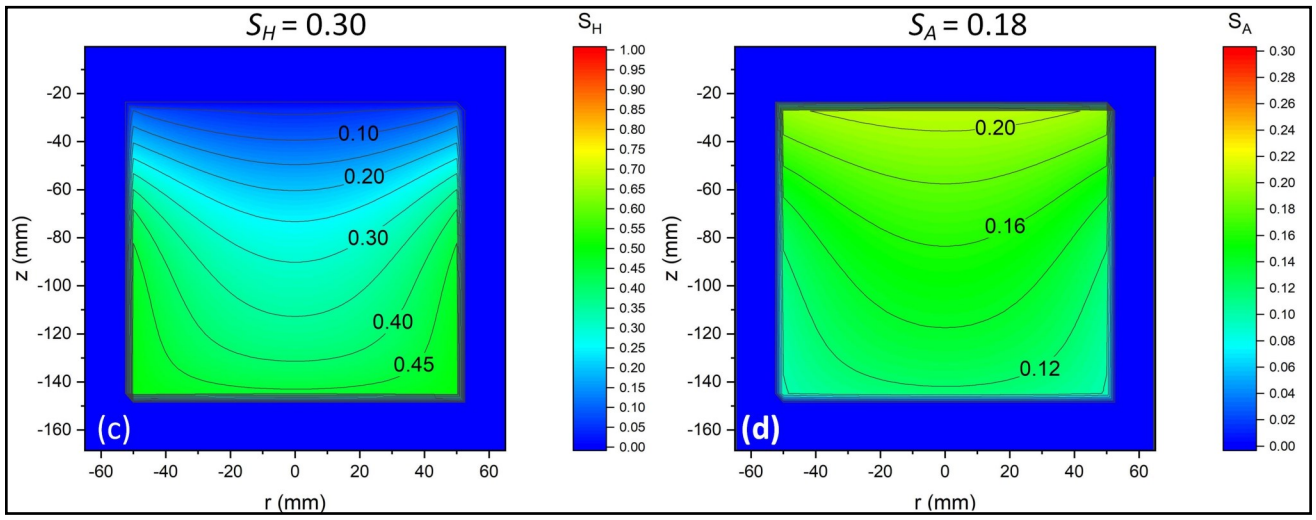
Visiting scientist

Specializes in numerical simulation of production from hydrate reservoir

Dr Jun Lin TOO

Research Fellow

Specializes in hydraulic fracturing of hydrate bearing sediment



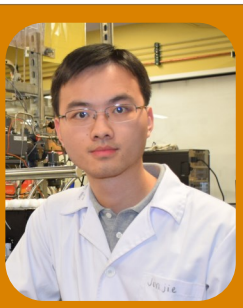
Spatial distribution of hydrate phase (S_H) and aqueous phase (S_A) predicted from the simulation modelling the MH formation process induced by a cooling process. *Heterogeneity of all phases* are predicted.

CO_2 CAPTURE

Statistics

No. of Publication : 2

No. of Conference Presentation : 1



Dr. Junjie ZHENG

Research Fellow

Specializes in experimental studies (both thermodynamics and kinetics) on hydrate process, Raman and DSC measurement.

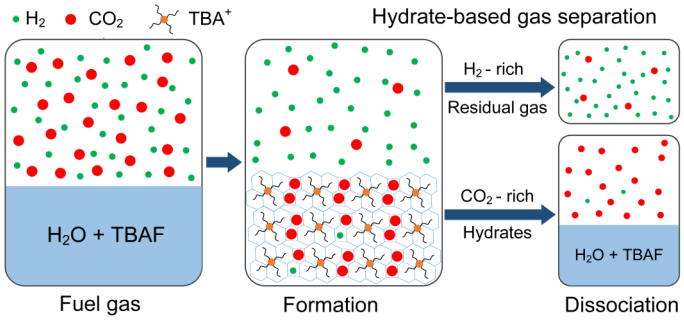
Mr. Niranjan Kumar LOGANATHAN

Master's Student

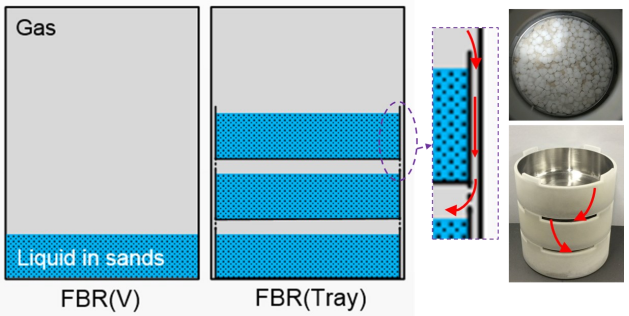
Specializes in experimental studies (both thermodynamics and kinetics) on hydrate process.

Hydrate based gas separation (HBGS) Technology

CO_2 capture has become an important part in building a sustainable energy system featuring the clean use of fossil fuels with low carbon footprint. Hydrate based gas separation (HBGS) is one of the potential technologies to capture carbon dioxide from pre-combustion and post-combustion streams. In Linga Lab@NUS, we are working towards making HBGS a disruptive technology that has higher kinetics, better separation efficiency, and lower energy cost. A fixed bed reactor (FBR) approach has been developed and well-investigated to enhance the kinetics and reduce the energy intensity. A tray column design has been proposed to scale up the FBR process. We also identified a semiclathrate promoter, tetra-n-butylammonium fluoride (TBAF), to shift hydrate formation toward ambient temperature (298.0 K) to reduce the cooling demand. In addition, various instrumental techniques such as micro-differential scanning calorimetry (μDSC) and Raman spectroscopy were employed to provide valuable insights into the hydrate fundamentals.



A semiclathrate based hydrate process employing TBAF was developed to capture CO_2 at ambient temperature.



A FBR approach with a tray column design was developed to scale up bed size without sacrificing the kinetics. (Top right image shows hydrates formed in the top tray seen from top view).

DOI: 10.1021/acssuschemeng.8b02187; 10.1016/j.apenergy.2018.02.133

RECOGNITIONS

2018 has been another fruitful year for us. Our lab members have won numerous awards, a few are highlighted below

Prof. Linga has been identified as the 2018 Highly Cited Researcher in Engineering by Clarivate Analytics.

This list represents in the past 10 years, "Researchers who, within an ESI-defined field, publish highly cited papers are judged to be influential, so the production of multiple top 1% papers is interpreted as a mark of exceptional impact.", according to Clarivate Analytics. 204 scientists have been listed in the field of Engineering representing approximately the top 0.1% within the field worldwide.


Web of Science

Clarivate Analytics

2018 HIGHLY CITED RESEARCHER

presented to

Praveen LINGA

In recognition of exceptional research performance demonstrated by production of multiple highly cited papers, those that rank in the top 1% by citations for field and year, in

Engineering

Annette Thomas
CEO, Web of Science Group
Clarivate Analytics

Date November 27, 2018


NUS National University of Singapore

Honours List
2016/2017

is presented to

Assoc Prof Praveen Linga

of the

DEPARTMENT OF CHEMICAL & BIOMOLECULAR ENGINEERING

in recognition of his dedication and commitment to the education of the engineering students

15 March 2018

Dean
Faculty of Engineering

Prof. Linga is inducted into the NUS Faculty of Engineering Teaching Honors List for AY2016/2017 in recognition of his dedication and commitment to the education of the engineering students.

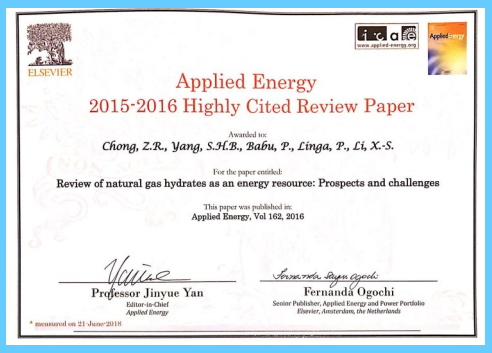
Prof. Linga has been appointed as the Dean's Chair Professor in NUS Engineering for 3 years effective from 01 January 2019 to 31 December 2021. The citation reads as "This appointment is in recognition of your outstanding and impactful scholarly accomplishments that are well acknowledged."

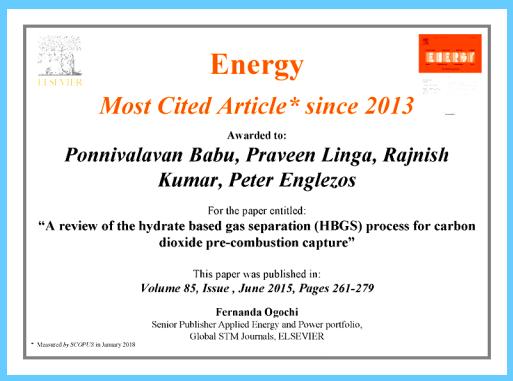
Recognitions

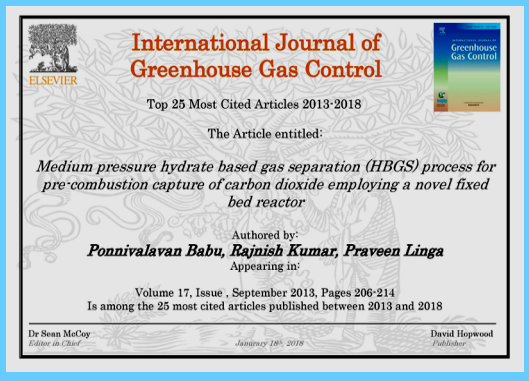
Research Fellow Dr. Ponnivalavan Babu received ChemEngineering Travel Award, MDPI Switzerland (2018)

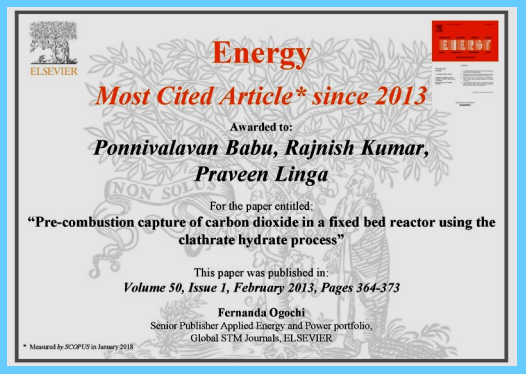
Undergraduate researcher Yanjie Lin received AIChE Singapore Local Section Outstanding Undergraduate Final Year Research Thesis Award (2018)

Paper Awards









TECHNOLOGY & GRANTS

LNG Cold Energy Utilization to Desalinate Sea Water Employing the Hydrate Based Desalination (HBD) Process

Linga Lab@NUS and BG Group have signed a Research Collaboration Agreement (RCA) for developing a hydrate based desalination technology for seawater desalination utilizing LNG cold energy. BG Group will support research activities to the tune of S$120,000 for the duration of three years. BG Group is a world leader in natural gas and a supplier for the first 3 million tonnes per annum of LNG to Singapore. To know more about BG Group, please visit: http://www.bg-group.com

Dr. Linga has also secured a major research grant to develop a hydrate based desalination technology for producing water from seawater by harvesting LNG cold energy. Energy Market Authority (EMA) has awarded S$27 million in research grants to 13 industry-partnered projects in the areas of Gas Technology and Smart Grids. Read More!

SNG (solidified natural gas) Technology for Natural Gas Storage via Clathrate Hydrates

Linga lab secured a competitive grant to develop SNG (solidified natural gas) technology for natural gas storage via clathrate hydrates. Read more on Energy Market Authority (EMA) Media release!

Linga Lab@NUS led by Prof. Linga and Lloyd's Register Global Technology Centre Pte Ltd (LR GTC) have signed a Research Collaboration Agreement (RCA) for developing SNG (solidified natural gas) technology for natural gas storage. LR GTC will support research activities to the tune of S$350,000 for the duration of three years. Read more.

Natural Gas Centre

Centre for Energy Research & Technology (CERT) aims to galvanize a multi-disciplinary university-industry collaborative **Consortium of Excellence on Natural Gas (CENGas)** to innovate technologies for exploiting natural gas both as an energy source and feedstock. It brings together multi-disciplinary strengths in the Faculty of Engineering. The team's mix of expertise ranges from molecular simulation and prototype demonstration to system scale-up and optimization, and its collective strengths are hard-to-match.

Semiclathrates as Thermal Energy Carrier & Storage for District Cooling

This grant is supported by Ministry of Education (MOE) under Academic Research Fund (AcRF) Tier 1 (S$150,527 for the duration of three years). The project aims to conduct fundamental research for the development of novel and economically feasible approach for thermal energy carrier and storage, in which semiclathrate hydrate slurry will be used as thermal storage medium.

Lloyd's Register

Centre for Energy Research & Technology (CERT)

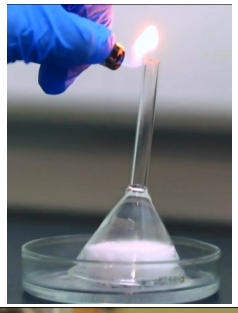
ENERGY MARKET AUTHORITY
Smart Energy, Sustainable Future

NUS National University of Singapore

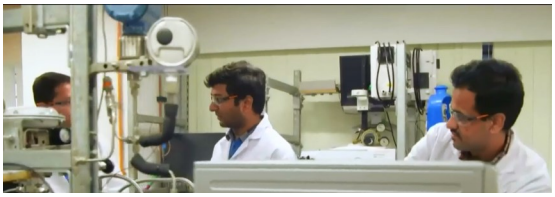
Ministry of Education SINGAPORE

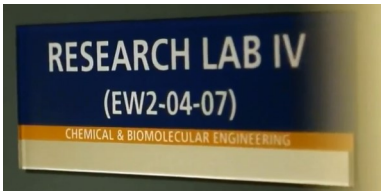
MEDIA REPORT

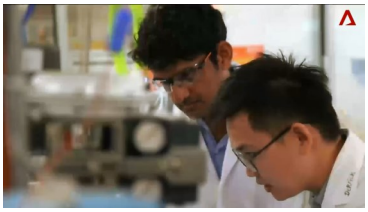
Linga Lab@NUS Annual Report **2018**



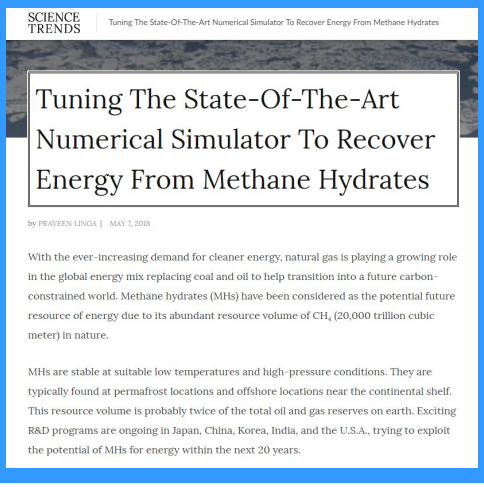
Our research is featured in Channel News Asia in their special program "Powering the future: Keeping cool with LNG." The complete program can be found on CNA website.







Prof Linga shared his expert opinion on the use of Numerical simulator to enable energy recovery from hydrates and CO2 capture using semiclathrates at ambient temperature on *Science Trends* .

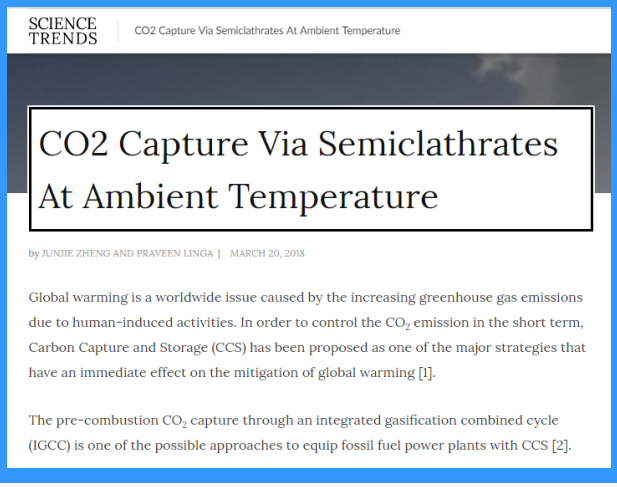

SCIENCE TRENDS | Tuning The State-Of-The-Art Numerical Simulator To Recover Energy From Methane Hydrates

Tuning The State-Of-The-Art Numerical Simulator To Recover Energy From Methane Hydrates

by PRAVEEN LINGA | MAY 7, 2018

With the ever-increasing demand for cleaner energy, natural gas is playing a growing role in the global energy mix replacing coal and oil to help transition into a future carbon-constrained world. Methane hydrates (MHs) have been considered as the potential future resource of energy due to its abundant resource volume of CH_4 (20,000 trillion cubic meter) in nature.

MHs are stable at suitable low temperatures and high-pressure conditions. They are typically found at permafrost locations and offshore locations near the continental shelf. This resource volume is probably twice of the total oil and gas reserves on earth. Exciting R&D programs are ongoing in Japan, China, Korea, India, and the U.S.A., trying to exploit the potential of MHs for energy within the next 20 years.


SCIENCE TRENDS | CO2 Capture Via Semiclathrates At Ambient Temperature

CO2 Capture Via Semiclathrates At Ambient Temperature

by JUNJIE ZHENG AND PRAVEEN LINGA | MARCH 20, 2018

Global warming is a worldwide issue caused by the increasing greenhouse gas emissions due to human-induced activities. In order to control the CO_2 emission in the short term, Carbon Capture and Storage (CCS) has been proposed as one of the major strategies that have an immediate effect on the mitigation of global warming [1].

The pre-combustion CO_2 capture through an integrated gasification combined cycle (IGCC) is one of the possible approaches to equip fossil fuel power plants with CCS [2].

Prof Linga was featured in a scientific outreach television program aired in National Television channel in China (CCTV4). In this program, Professor Linga interacted with youths aged between 7-14 years old and introduced the prospects of natural gas hydrates to the younger generation. View the full program (in Chinese) on YouTube! (the section featuring Prof Linga is between 21 to 25th minute of the program).

Channel News Asia (CNA) interviewed Prof Linga for the use of natural gas to sustain stable, clean power generation. Read more.

CNA Insider

Stepping on the gas to keep Singapore's lights burning

When completed, the monster on Jurong Island will be one of the world's largest liquefied natural gas storage tanks – and a step closer to energy security for Singapore, as the programme Powering the Future finds out.

【Progress in Applied Energy】利用气体水合物进行天然气固态储存技术研究进展

AEii国际应用能源 5月19日

来源：www.sciencedirect.com

Applied Energy

Volume 216, 15 April 2018, Pages 262-285

ELSEVIER

Progress in Applied Energy

《Progress in Applied Energy》的定位是《Applied Energy》的精品选集，主要从已出版的《Applied Energy》论文中挑选出具有重大科学发现和应用价值的优秀论文，本次选集共选出6篇论文，主要涉及天然气储运技术、太阳能光伏电池、分布式能源系统、氢燃料电池、电网系统优化等方面。

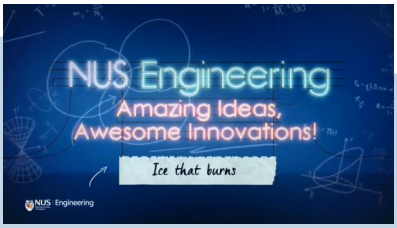
《Progress in Applied Energy》期待广大科研工作者在**应用能源**领域做出更好的突破性研究并赐稿。

利用气体水合物进行天然气固态储存技术研究进展

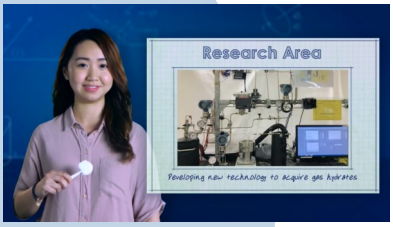
A review of solidified natural gas (SNG) technology for gas storage via clathrate hydrates

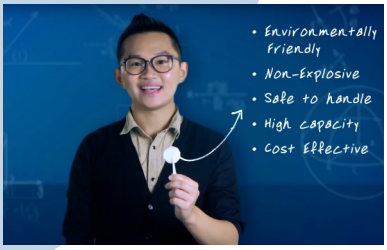
Hari Prakash Veluswamy [a], Asheesh Kumar [a], Yutaek Seo [b], Ju Dong Lee [c], Praveen Linga [a]

Our publication (Applied Energy *216*, 262-85) was highlighted in "Progress in Applied Energy", which is edited in Chinese. Read more!

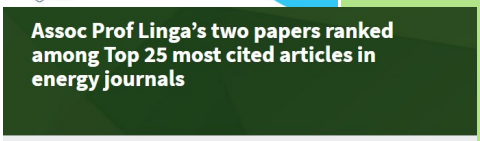


Our research is highlighted in NUS Engineering: Amazing Ideas, Awesome Innovation, a series of video featuring cutting edge research developed in NUS Engineering faculty. Check out the YouTube link!





Some of our awards in 2018 (e.g. ChemEngineering Travel Award, Applied Energy Best Paper Awards, Prof Linga's appointment as Dean's chair professor) were featured in **NUS Engineering News**.



PUBLICATIONS

Linga Lab@NUS Annual Report **2018**

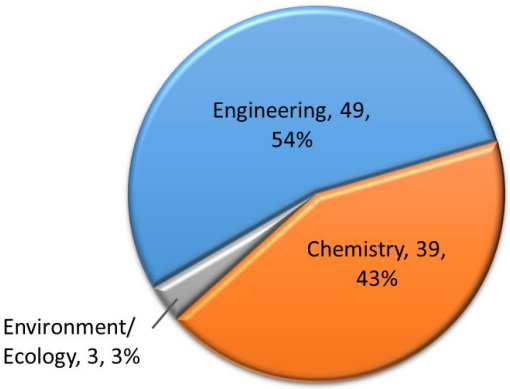
1. Hydrate phase equilibrium data of mixed methane-tetrahydrofuran hydrates in saline water.
   Kumar, A.; Vedula, S. S.; Kumar, R.; Linga, P.*; The Journal of Chemical Thermodynamics 2018, 117, 2-8. [DOI: 10.1016/j.jct.2017.05.014].
   (Invited submission for a special issue "Gas Hydrates")
2. Numerical analysis of experiments on thermally-induced dissociation of methane hydrates in porous media.
   Yin, Z.; Moridis, G.*; Chong, Z. R.; Tan, H. K.; Linga, P.*; Industrial & Engineering Chemistry Research 2018, 57 (17), 5776-5791. [DOI: 10.1021/acs.iecr.7b03256].
   (Invited submission for a special issue for PSE Advances in Natural Gas Value Chain)
3. Hydraulic fracturing in a penny-shaped crack. Part I: Methodology and testing of frozen sand .
   Too, J. L.*; Cheng, A.; Khoo, B. C.; Palmer, A.; Linga, P.*; Journal of Natural Gas Science and Engineering 2018, 52, 609-618. [DOI: 10.1016/j.jngse.2017.12.022] .
4. Hydraulic fracturing in a penny-shaped crack. Part II: Testing the frackability of methane hydrate-bearing sand.
   Too, J. L.*; Cheng, A.; Khoo, B. C.; Palmer, A.; Linga, P.*; Journal of Natural Gas Science and Engineering 2018, 52, 619-628. [DOI: 10.1016/j.jngse.2018.01.046] .
5. A review of gas hydrate growth kinetic models.
   Yin, Z.; Khurana, M.; Tan, H.K.; Linga, P.*; Chemical Engineering Journal 2018, 342, 9-29. [DOI: 10.1016/j.cej.2018.01.120].
   (Invited Review)
6. Effect of horizontal wellbore on the production behaviour from marine hydrate bearing sediment.
   Chong, Z. R.; Zhao, J.*; Chan, J. H. R.; Yin, Z.; Linga, P.*; Applied Energy 2018, 214, 117-130. [DOI: 10.1016/j.apenergy.2018.01.072].
7. Effect of eco-friendly cyclodextrin on the kinetics of mixed methane-tetrahydrofuran hydrate formation.
   Lin, Y.; Veluswamy, H. P.*; Linga, P.*; Industrial and Engineering Chemistry Research 2018, 57 (17), 5944-5950. [DOI: 10.1021/acs.iecr.7b05107].
   (Invited submission for a special issue for PSE Advances in Natural Gas Value Chain)
8. A review of solidified natural gas (SNG) technology for gas storage via clathrate hydrates.
   Veluswamy, H. P.; Kumar, A.; Seo, Y.; Lee, J. D.; Linga, P.*; Applied Energy 2018, 216, 262-285. [DOI: 10.1016/j.apenergy.2018.02.059]
   (Featured under a special section "Progress in applied energy")

9. Semiclathrate based CO2 capture from fuel gas mixture at ambient temperature: Effect of concentrations of tetra-n-butylammonium fluoride (TBAF) and kinetic additives.
   Zheng, J.; Bhatnagar, K.; Khurana, M.; Zhang, P.; Zhang, B.Y*; Linga, P.*; Applied Energy 2018, 217, 377-389. [DOI: 10.1016/j.apenergy.2018.02.133].
   (Invited submission for a special issue for CUE 2017 conference)
10. Numerical analysis of experimental studies of methane hydrate formation in a sandy porous medium.
    Yin, Z.; Moridis, G.*; Tan, H. K.; Linga, P.*; Applied Energy 2018, 220, 681-704. [DOI: 10.1016/j.apenergy.2018.03.075].
11. A novel conceptual design of hydrate based desalination (HyDesal) process by utilizing LNG cold energy .
    He, T.; Nair, S. K.; Babu, P.; Linga, P.*; Karimi, I. A.*; Applied Energy 2018, 222, 13-24. [DOI: 10.1016/j.apenergy.2018.04.006].
12. A review of clathrate hydrate based desalination to strengthen energy-water nexus .
    Babu, P.; Nambiar, A.; He, T.; Karimi, I.A.; Lee, J. D.; Englezos, P.*; Linga, P.*; ACS Sustainable Chemistry & Engineering 2018, 6 (7), 8093-8107. [DOI: 10.1021/acssuschemeng.8b01616].
13. Kinetic evaluation of cyclopentane as a promoter for CO2 capture via clathrate process employing different contact modes.
    Zheng, J.; Zhang, B.Y.; Wu, Q.; Linga, P.*; ACS Sustainable Chemistry & Engineering 2018, 6 (9), 11913–11921. [DOI: 10.1021/acssuschemeng.8b02187]
14. Effect of vertical wellbore incorporation on energy recovery from aqueous rich hydrate sediments.
    Chong, Z. R.; Moh, J. W. R..; Yin, Z.; Zhao, J.*; Linga, P.*; Applied Energy 2018, 229, 637-647. [DOI: 10.1016/j.apenergy.2018.08.020].
15. Numerical analysis of experimental studies of methane hydrate dissociation induced by depressurization in a sandy porous medium.
    Yin, Z.; Moridis, G.*; Chong, Z.R.; Tan, H. K.; Linga, P.*; Applied Energy 2018, 230, 444-459. [DOI: 10.1016/j.apenergy.2018.08.115].
16. Morphology study on the effect of thermodynamic inhibitors during methane hydrate formation in presence of NaCl.
    Kim, H.; Veluswamy, H.P.; Seo, Y.*; Linga, P.*; Crystal Growth & Design 2018, 18 (11), 6984-6994. [DOI: 10.1021/acs.cgd.8b01161].
17. Alleviation of foam formation in a surfactant driven gas hydrate system: Insights via a detailed morphological study.
    Pandey, G.; Bhattacharjee, G.; Veluswamy, H.P.; Kumar, R; Sangwai, J.; Linga, P.*; ACS Applied Energy Materials 2018, 1 (12), 6899-6911. [DOI: 10.1021/acsaem.8b01307]

IMPACT ANALYSIS

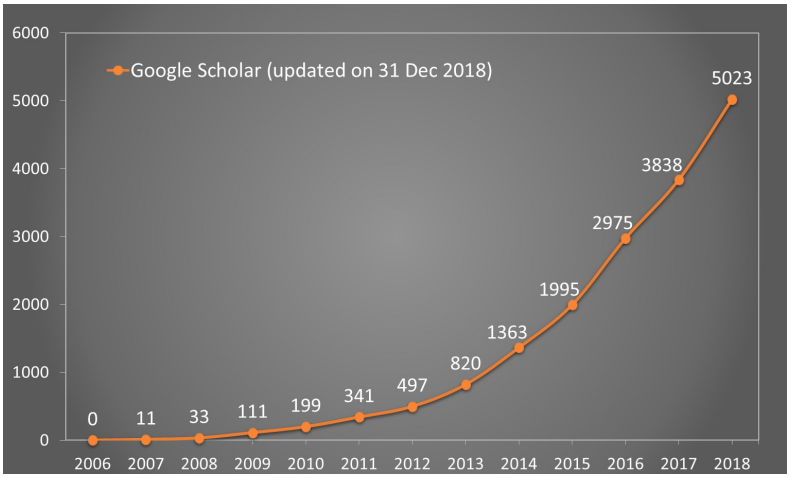
Publication Statistics

Subject Classification (ESI, Clarivate Analytics)



Citation Statistics

Essential Science Indicators (ESI) Clarivate Analytics	
Highly Cited Papers as of 2018	12
Hot Papers in 2018	1



	Scopus	Web of Science	Google Scholar
Total Publications (as of 2018)	92	92	92
Total Citations (as of 2018)	4065	3803	5023
Citations per paper	44.18	41.33	54.60
h-index	36	34	38
Field-Weighted Citation Impact (FWCI)*	3.77	-	-

*FWCI in SciVal (Elsevier) indicates how the number of citations received by an entity's publications compares with the average number of citations received by all other similar publications. An FWCI of 1.0 indicates a scientist's impact is about the global average, a value above 1.0 indicates impact is above global average (i.e. FWCI of 2.11 means, 111% above the global average).

VISITORS

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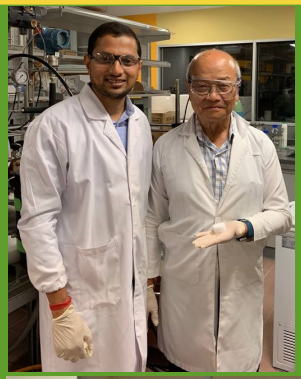
Prof Jitendra Sangwai of IIT Madras



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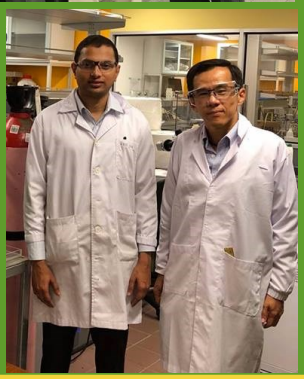
Prof Pramoch Rangsunvigit from PETROMAT and Chulalongkorn University



Professor Yutaek Seo from Seoul National University

KEYNOTE/INVITED

International Youth Forum on Gas Hydrates

Keynote Talk

Qingdao, China, July 28, 2018

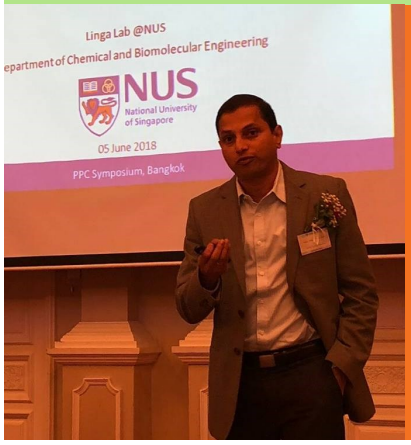
The 10th International Conference on Applied Energy

Invited Panel Talk

Hong Kong, China, Aug 22, 2018

International Symposium on In-Situ Modification of Deposit Properties for Improving Mining

Keynote Talk, Taiyuan, China, September 19, 2018



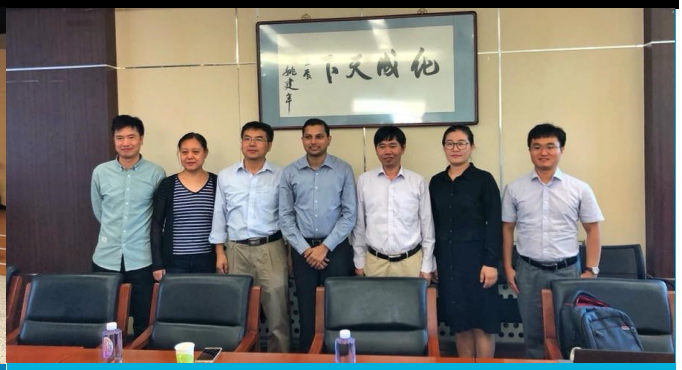
The 24th PPC Symposium on Petroleum, Petrochemicals, and Polyjmers

Keynote Talk

June 06, 2018

KEYNOTE/INVITED

Invited Seminar
National Taiwan University of Science and Technology
November 13, 2018



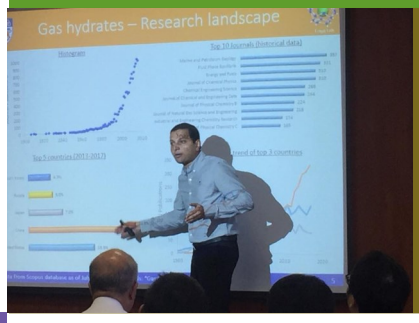
Invited Seminar
China University of Petroleum (Beijing), China
September 20, 2018

Invited Seminar
Jilin University, China, August 01, 2018

Invited Seminar
National Taiwan University, China
November 13, 2018

Invited Seminar
Harbin Engineering University, China, August 04, 2018

Invited Seminar
Heilongjiang University of Science and Technology
August 04, 2018



Invited Seminar
Dalian University of Technology, China
July 31, 2018

Invited Visit
Qingdao Institute of Marine Geology, China
July 26, 2018

CONFERENCES

Offshore Technology Conference (OTC) Asia 2018

In March 2018, Linga Lab team presented in Offshore Technology Conference (OTC) Asia 2018 held in Kuala Lumpur, Malaysia. In the conference, our team delivered 3 oral presentations (delivered bv Dr Chong [a], Dr. Too and Mr. Zhenyuan Yin). Dr Chong and Mr. Zhenyuan Yin at the conference dinner [b].

AIChE 2018

a

Our team delivered four presentations of our rgas hydrate research activities at the American Institute of Chemical Engineers' (AIChE) 2018 Annual meeting held at Pittsburgh, PA, USA between October 28th to November 2nd.

Prof Linga chaired the session on Gas hydrates Science and Engineering during the conference. Dr. Babu [a] presenting during the conference.

PRESENTATIONS

10th International Conference on Applied Energy

In October 2018, Mr. Zhenyuan [a] and Dr. Zheng [b] presented their research in the 10th International Conference on Applied Energy Research held in Hong Kong. Prof Linga was a part of the panel discussion on gas hydrates [c]

TOUGH Symposium 2018

In October, Zhenyuan presented in TOUGH symposium 2018 in Berkeley, California.

GRADUATIONS

Our members sharing joy with graduates from Linga Lab! From left: Zhenyuan, Abhishek, Dr Valavan, Junjie, Regine, Dr Derrick, Prof Linga, Farhan, Junxiong, Dr Asheesh, Dr Hari and Yanjie.

Our member Dr. Too Jun Lin and his family members with Prof Praveen Linga .

Our FYPs Mr. LIAO Junxiong, Mr. LIN Yanjie and their mentor Dr. Hari Prakash Veluswamy with Prof Praveen Linga

Our member Dr. Derrick Chong and his family members with Prof Linga

Our FYP Ms. MOH Jia Wei and her mentor Dr. Derrick with Prof. Praveen Linga

SERVICES

Editorial Services

- **Associate Editor**

  Journal of Natural Gas Science and Engineering, March 2015 – Present

- **Subject Editor**

  Applied Energy, September 2018 – Present

- **Editorial Board Member**

  Journal of Natural Gas Industry B, July 2017 – Present

Professional Services

- Registered member of Professional Engineers (PE Chemical) in Singapore
- Session Chair, International Symposium on In-situ Modification of Deposit Properties for Improving Mining, September 17-19, 2018, Taiyuan, China
- Session Chair for two sessions, International Conference on Applied Energy (ICAE2018), August 22-25, 2018, Hong Kong
- Hydrate Youth Forum Organizing Committee Member, 2nd International Deepwater Oil and Gas Engineering Frontier Technology Seminar and International Hydrate Youth Forum, Qingdao, July 26-28, 2018, China
- Session Chair, International Conference on Desalination (InDA2018), April 20-21, 2018, India
- Session Chair, Offshore Technology Conference Asia (OTC Asia – 2018), March 20-23, 2018, Kuala Lumpur, Malaysia
- Programme Committee Member, Society of Mining, Metallurgy and Exploration (SME), Offshore Technology Conference Asia (OTC Asia – 2018), Kuala Lumpur, Malaysia

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NUS National University of Singapore
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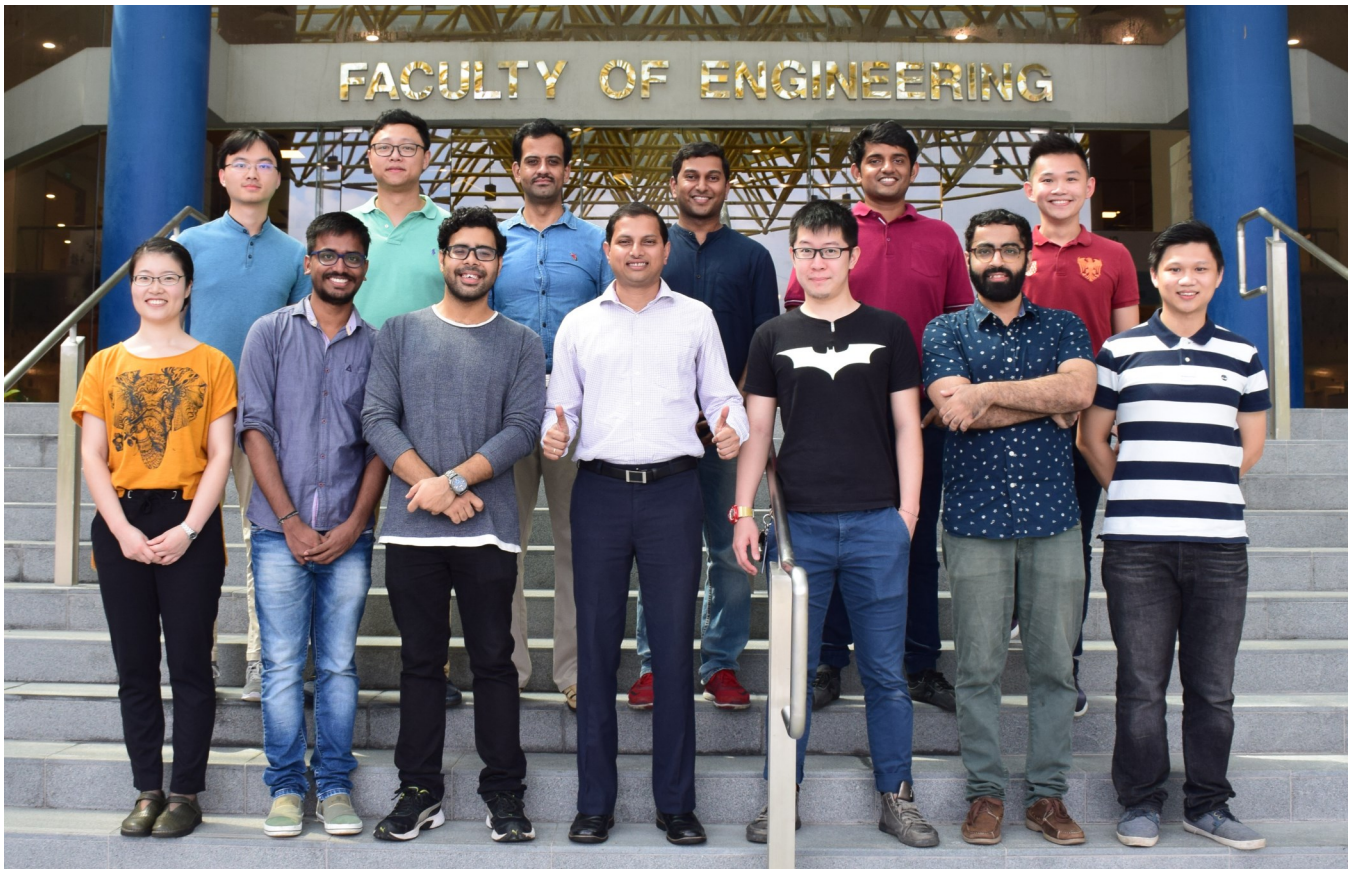
ENSTA ParisTech université PARIS-SACLAY
SEOUL NATIONAL UNIVERSITY
Chulalongkorn University จุฬาลงกรณ์มหาวิทยาลัย
INDIAN INSTITUTE OF TECHNOLOGY MADRAS
SHANGHAI JIAO TONG UNIVERSITY
DALIAN UNIVERSITY OF TECHNOLOGY
Guangzhou Institute of Energy Conversion, Chinese Academy of Sciences
TAIYUAN UNIVERSITY OF TECHNOLOGY
HEFEI UNIVERSITY OF SCIENCE AND TECHNOLOGY

Our Family



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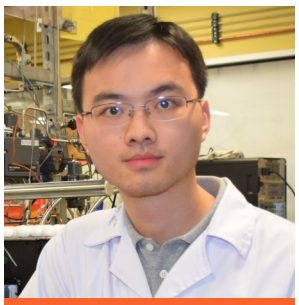
Dr Zheng Rong CHONG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Dr Hari Prakash VELUSWAMY


Mr Zhenyuan YIN


Mr Niranjan Kumar LOGANATHAN

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