

## BHAJAN LAL

Perak, Malaysia

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Membership: CChem, MRACI, IACC, ACS, MILRS, MyCarbon Society,

### PROFILE SUMMARY:

#### Teaching:

- MSc and PhD (Physical Chemistry) Chemistry Department, Jamia Millia Islamia Central University, New Delhi, India ([Thesis Abstract](#))
- Since 2013, Teaching Physical Chemistry subject to Chemical Engineering Undergraduate with Students Evaluation Score +90%.
- Expertise in Flipped Learning and Experiential Learning-based teaching to undergraduate students.
- Secured educational grant, published educational papers and won awards in T&L conference.

#### Research:

- Published **7** Research books, **8** Book Chapters, **310** Peer Review Research papers and **5** Patents with high citation record **7384** with H-index **48** and i10-index **150**.
- As Project Leader, completed **18** Research Projects and **2** on-going CO<sub>2</sub> hydrate-based research (Total Grant amount **901,814.90 USD**) and won several awards in Gas Hydrate research area.
- Supervised **2** Postdocs, Graduated **10** PhD, **8** MSc, **120** FYP students, **12** ETP groups.
- Professional membership of IACC, MRACI- Chartered Chemist, MILRS, MyCarbon Society.
- Secured and Delivered **5** Consultancy projects from **PETRONAS**, PTTEP-Malaysia, DIXSON FA Sdn Bhd, Petrotechnical Inspection (M) Sdn Bhd
- Delivered **9** customized Short Courses organized by <https://cape.utp.edu.my/>
- Securing sponsorships for academic as well research activity for department/university level.

#### Educational outreach activities and administration

- Invited speaker for Educational cum motivational and career-oriented talks to national and international schools.
- Invited keynote speaker in national and international conferences, seminars and webinars.
- Custodian of **5** MoU/MoA with Indian Universities where Research attachment, Student exchange program, Campus familiarization program conducted.
- Served Department with various assigned Coordinator duties such as Student Mobility Coordinator, Final Year Project I Coordinator and Adjunct Lecture Coordinator.
- Focal Person of UTP Research & Academic collaboration with North Indian Universities

## EDUCATION QUALIFATION

- ⇒ **PhD** (Physical Chemistry) Jamia Millia Islamia Central University, New Delhi, India **2004**
- ⇒ **MSc** (Physical Chemistry) Jamia Millia Islamia Central University, New Delhi, India **2001**
- ⇒ **BSc** (Chemistry) Post Graduate Govt. College of Men, Chandigarh, Punjab, India **1998**

## WORK EXPERIENCES

<b>Employer</b>	<b>Position</b>	<b>Period</b>	<b>Department</b>
UTP-Malaysia	Assoc. Prof.	Dec 2022-Conti...	Chemical Engineering
UTP-Malaysia	Sen. Lec.	June 2015-dec 2022	Chemical Engineering
UTP-Malaysia	Lecturer	Dec. 2013-May 2015	Chemical Engineering
UTP-Malaysia	Postdoc	Sep 2012-Dec. 2013	Chemical Engineering
Akdeniz Univ, <b>Turkey</b>	Postdoc	Mar. 2011-Mar 2012	Chemistry Department
SGGS-college Punjab, <b>India</b>	Lecturer	Ap. 2010-Mar 2011	Industrial Chemistry Dept
UBC, <b>Canada</b>	Postdoc	Ap. 2009-Mar 2010	NBE Institute Mining Engg
SUNY, Binghamton, <b>USA</b>	Postdoc	Aug 2008 to Mar 2009	Chemistry Department
UCT Univ <b>South Africa</b>	Postdoc	April 2007-sep 2008	Chemistry Department
Pretoria Univ <b>South Africa</b>	Postdoc	May 2005-Ap 2007	Chemistry Department

## EDUCATIONAL GRANT

- **Bhajan LAL** (Project Leader): *The flipped classroom technique to improve student's conceptual understanding and its application in solving complex numerical problems in Physical Chemistry Course. SoTL 2021 (The Scholarship of Teaching and Learning)*

## PUBLICATION IN TEACHING

- *Effective use of teaching and Learning Resource: **Bhajan Lal\***. TLIF2020. Poster Presentation*
- *Creative approach towards online teaching for first year engineering students: Sirisha Nallakukkala, **Bhajan Lal\***, Abd Halim Shah bin Maulud. ICARE'21 Proceeding*
- *Utilization Of Customized Handbooks For Physical Chemistry Students. Bhajan Lal\*. TLIF2021 Poster Presentation*
- *Blended approach with experiential learning through e-portfolios and case studies in engineering education, Sirisha Nallakukkala, Bhajan Lal\* MICER 2023, Malaysia*
- *Developing Complex Problem-solving Skills among Physical Chemistry Students by implementing flipped classroom module, Sirisha Nallakukkala & Bhajan Lal, ICARE'23, Malaysia (Conference paper) pp 455–460 ([Link](#))*

- *The Flipped classroom technique to improve students' understanding of concepts in Physical Chemistry coursework*, Sirisha Nallakukkala, **Bhajan Lal\***, Haslinda Zabiri, **International J Teach, Learn Edu Dev** 3,6 (2024) 10-14 ([Link](#))
- *Experiential Learning in Engineering Education: A Bibliometric Analysis of Perceptions and Transformations*, **Bhajan Lal\***, M Nawaz, H Zabiri, CS Li, P Kumar, **International J Teach, Learn Edu Dev**, 4, 5 (2025) 22-29 ([LINK](#))

### **COMMUNITY OF PRACTICE ([LinkenID](#))**

1. From Teaching Slides to Customized textbook for Engineering Students (2019)
2. Action Research in Chemistry Teaching (2020)
3. E-Course portfolio as assessment in physical chemistry (2021)
4. Case Studies based Teaching and Learning in Physical Chemistry (2022)
5. Gas Clathrate Hydrate Experiment for physical chemistry students: Phase behavior study (2023)
6. Bridging the gap between theoretical and practice through Experiential Learning (2024)

### **RESEARCH INTEREST**

- Gas Hydrate
- Artificial Intelligence Machine Learning
- Flow Assurance
- Desalination

### **4 PATENTS on Gas hydrate based Green Desalination Process**

- PI2020005898 MyIPO (Malaysia Patent)
- US11912588B1 (US patent)
- Indian Patent

### **AWARDS AND HONORS**

1. Gold Medel medal in **MTE2025** (capturing carbon: pathway to Commercialization of gas hydrate technology) [LINK](#)
2. Silver medal in **MTE2025** (REE Recovery-Potential of Commercializing gas hydrate based desalination technology) [LINK](#)
3. Silver medal in **MTE2024** (REE extraction-based gas hydrate desalination technology)
4. Bronze medal in **MTE2023** (gas hydrate-based desalination technology)
5. Broze Medal for Poster Presentation in **TLIF Exhibition 2022**, UTP, Malaysia
6. Bronze Medal in Sirim Exhibition (**Si2TE2022**), Kulim, Malaysia,
7. Gold medal in UniMAP (EREKA **2022**) (green desalination technology) [LINK](#)
8. Gold medal in **MTE2021** (gas hydrate-based desalination process)
9. Gold medal in **ITEX'2021** (Green gas hydrate process for desalination)
10. Silver medal for best poster in **TLIF 2020**
11. Bronze medal for best poster in **TLIF 2021**
12. Silver Medal for TLIF Exhibition **2020**, UTP, Malaysia,
13. Silver Medal in TLIF Exhibition **2019**, UTP, Malaysia

**RESEARCH GRANT AS PROJECT LEARDER**

<b>No</b>	<b>Research Grant Title</b>	<b>Fund</b>	<b>Fund Amount (RM)</b>	<b>Duration</b>
1	Experimental measurements and modeling of phase behavior of natural gas with high CO <sub>2</sub> content at pressure and temperature ranges covering reservoir to surface conditions	YUTP	248,000.00	2014-2016
2	Kinetic of <b>Hydrate</b> Formation: Flow Assurance and Separation	PRF	565,950.00	2014-2016
3	Investigation of <b>gas hydrate</b> inhibition mechanism using dual function low dosage inhibitor	URIF	50,000	2015-2016
4	Kinetic study of biodegradable inhibitor for CH <sub>4</sub> and CO <sub>2</sub> and mixed <b>gas hydrates</b>	FRGS	121,000.00	2017-2018
5	Investigation of dual function <b>gas hydrate</b> inhibitor for natural gas with high CO <sub>2</sub> content.	PRF	432,623.00	2018-2019
6	Fundamental study on cryogenic high pressure liquid-vapor (L-V) separation characteristics of Malaysian natural gas with high carbon dioxide content	YUTP	193,000.00	2017-2019
7	Interfacial Phenomenon of <b>Hydrate</b> Agglomeration Suppression by Non-ionic Surfactants	PTTEP-Malaysia	30,000.00	2019-2020
8	CO <sub>2</sub> <b>hydrate</b> formation and stability study at seabed conditions,	PRF	433,844.40	2019-2020
9	Development of multipurpose <b>gas hydrate</b> and corrosion inhibitor for offshore applications	YUTP	193,000.00	2019-2021 Completed
10	Investigation of <b>gas hydrate</b> formation in the presence of green dual function gas hydrate inhibitor for Multiphase flow lines.	JRP	134,000.00	2020-2021
11	Evaluation of Filter Based <b>Gas Hydrate</b> Desalination Process Using Green Biodegradable Promoter	KAU-Grant	121,000.00	2021-2022
12	Experimental Measurement of Biodegradable <b>Hydrate</b> Inhibitors for Rich Co <sub>2</sub> Natural Gas System	YUTP	271,000.00	2022-2023
13	Phase Behaviour study during blowdown of rich CO <sub>2</sub> content Natural Gas from <b>cryogenic process</b>	FRGS	153,800.00	2021-2023
14	Intelligent corrosion rate prediction influenced by <b>gas hydrate</b> in natural gas pipeline	JRP	24000.00	2022-2023
15	CFD study of corrosion rate influence by <b>gas hydrate</b> in High CO <sub>2</sub> natural gas system.	YUTP	128,390.00	2022-2024
16	Utilization of CO <sub>2</sub> as natural refrigerant for <b>cryogenic separation process</b> : Simulation study.	YUTP	128,390.00	2022-2024
17	Selectivity and Separation Efficiency of CO <sub>2</sub> From Flue Gas Mixture by <b>Gas Hydrate</b> Process	YUTP	128,390.00	2022-2024
18	Simulation And Techno-economic Analysis of <b>Hydrate</b> Based Carbon Process	YUTP	128,390.00	2022-2024
19	Extraction of rare earths by <b>gas hydrate</b> -based desalination	YUTP	200,000.00	2023-2025
20	CO <sub>2</sub> and NG <b>Hydrate</b> Based Produced Water Desalination: Thermodynamic Study	YUTP	200,000.00	2022-2024
<b>Total Amount</b>			<b>RM 4.0 million</b>	

## **CONSULTANCY PROJECT**

CO <sub>2</sub> hydrate formation and stability study at Malaysia seabed conditions	PETRONAS-MALAYSIA (2020)	433,844.40 Completed
Thermodynamic Conditional Optimization for Desalination Reactor	Dixson FA Engineering Sdn Bhd (2022)	12500.00 Completed
Thermodynamic inhibition performance of regenerated MEG in different gas systems	PTTEP-Malaysia (2023)	RM50000.00 Completed
Testing of regenerated MEG gas hydrate inhibitor in different gas systems	PTTEP-Malaysia (2024)	RM50000.00 Completed
Testing of regenerated MEG gas hydrate inhibitor in different gas systems-Extension	PTTEP-Malaysia (2025)	RM50000.00 Conti...

## **SHORT COURSE DELIVERED**

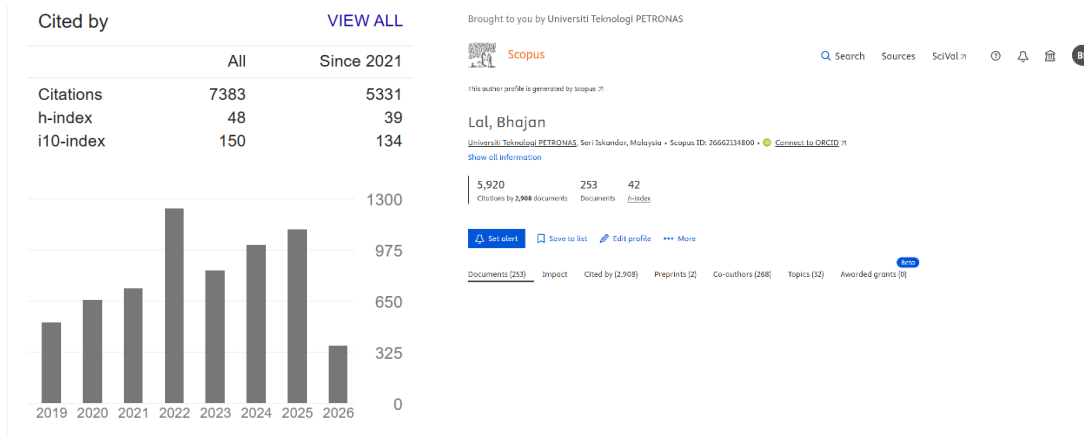
1. Machine Learning in Flow Assurance ([CAPE-UTP](#))
2. Multipurpose gas hydrate and corrosion inhibitors: A Prevention and Control Methods ([CAPE-UTP](#))
3. Gas hydrate in natural gas exploration, production and processing: preventive and control methods ([CAPE-UTP](#))
4. Artificial Intelligent Machine Learning based predication tool for production chemistry/flow Assurance ([CAPE-UTP](#))
5. Practical Aspect of Gas hydrate in Flow Assurance Industry ([CAPE-UTP](#))
6. Oilfield Gas Hydrate-Corrosion Science and Engineering: Mitigating & Controlling Damage Mechanisms ([CAPE-UTP](#))
7. Flow Assurance solids in oil and gas Production: Practical applications for sustainable and optimal operations. ([CAPE-UTP](#))
8. Artificial Intelligent Machine Learning Based Predication Tool for Production Chemistry/Flow Assurance (Turkmenistan Oil & Gas University)

## **BOOKS PUBLISHED**

1. (Chemical Additives for Gas Hydrates) <https://link.springer.com/book/10.1007/978-3-030-30750-9> (2020)
2. (Ionic Liquids in Flow Assurance) <https://link.springer.com/book/10.1007/978-3-030-63753-8> (2020)
3. (Gas Hydrate in Water Treatment: Technological, Economic, and Industrial Aspects) <https://onlinelibrary.wiley.com/doi/book/10.1002/9781119866145> (2022)
4. (Hydrate Control in Drilling Mud) <https://link.springer.com/book/10.1007/978-3-030-94130-7> (2022)

5. (Machine Learning and Flow Assurance in Oil and Gas Production) <https://link.springer.com/book/10.1007/978-3-031-24231-1> (2023)
6. (Gas Hydrate in Carbon Capture, Transportation and Storage, <https://www.taylorfrancis.com/books/edit/10.1201/9781032726366/> (2024)
7. Artificial Intelligence and Machine Learning in Flow Assurance ([LINKI](#)) (2025)

**RESEARCH ARTICLE PUBLICATIONS ([Google Scholar](#)), ([Scopus](#))**



**Dr. Behzad Partoon:** “*Mathematical modeling for Gas hydrate formation and dissociation in porous media*” completed postdoc in **2018**.

**Dr. Saad Mohammad Khan:** “*Gas hydrate-based desalination using different type of promoter*” postdoc in **2022**.

**PhD students**

Student	Research Topic	status
Saad Khan	Investigation of Ammonium based Ionic Liquids for Gas Hydrate Mitigation	Completed (2018)
Omar Nashed	Study the impact of nanofluid on gas hydrates formation	Completed (2019)
Sana Yaqub	Investigation of biopolymer-based kinetic gas hydrate inhibitors for flow assurance	Completed (2020)
Ali Qasim	Investigation of Quaternary Ammonium Salts as Thermodynamic Gas Hydrate and Corrosion Inhibitors	Completed (2021)
Cornelius	Experimental and Modelling of The Impact of Ionic Liquids Water-Based Mud for Drilling Hydrate Sediments	Completed (2021)
Sirisha	Performance evaluation of gas hydrate formation for produced water treatment.	Completed (2023)

Amirun Nissa	CO <sub>2</sub> storage under Malaysian seabed conditions: Gas hydrate formation and dissociation study	Completed (2023)
Adeel Ur Rehman	Synergic effect of alcohol on gas hydrate mitigation	Completed (2024)
Sia Khor Foo	Investigation of tweens for Gas Hydrate Mitigation	Completed (2024)
Manjusha	CO <sub>2</sub> capture via gas hydrate formation using noble promotor	ongoing
Abdulrab	Gas hydrate formation in LNG Process: experimental and modeling study	ongoing
Mahmood	Desalination of rare earth metals via gas hydration formation	ongoing
Dileep Kumar	Gas Hydrate formation in LNG Process: Thermodynamic study	Ongoing

### **Master students**

<b>Student</b>	<b>Topic</b>	<b>Status</b>
Omar Nashed	Investigation of ionic liquids as thermodynamic and kinetic methane hydrate inhibitors	Completed (2015)
Jivan Divan Sundramoorthy	Catastrophic gas hydrate growth under shut-in and cold start-up conditions	Completed (2015)
Cornelius Behova	Performance Evaluation of Amino Acids for Gas Hydrate Mitigation	Completed (2015)
Nurani Kartikawati	An experimental investigation of aqueous Solution of AIL for CO <sub>2</sub> /CH <sub>4</sub> separation and application	Completed (2018)
Zamzila Kassim	An investigation of dual function hydrate inhibitor for carbon dioxide-methane mixtures	Completed (2020)
Vinayagam Sivabalam	Investigation of Type III Deep Eutectic Solvents for Thermodynamic CO <sub>2</sub> Hydrate Inhibition	Completed (2020)
Ihtisham	Effect of Ammonium-Based Ionic Liquids on Thermodynamic Gas Hydrate Inhibitors	Completed (2022)
Abdulrab	Gas hydrate formation in oil dominates pipeline conditions	Completed (2023)
Nurul Athirah	Development of machine learning model for early gas hydrate prediction	2025-2027

- Supervised approximately **95 final year project students**

- Supervised **11 Engineering Team Project** groups
- Supervised **90 industrial internship** students
- Supervised **3 MPU4 Projects** [LINK](#)(Community Engagement Projects) [Link](#), [Link](#))
- Supervised **30 international** PG and final year internship students

### **ADMINISTRATION POST**

- Adjunct Lecture Coordinator (Jan 2023 – 2025)
- Chemical Engineering Student's Advisor (Jan 2015- Conti...)
- Student Mobility Program Coordinator (Dec 2013 – Dec 2015)
- Final Year Undergraduate Research Project Coordinator (Jan 2016 – Oct 2022)
- Cluster member of Curriculum Review of Chem. Eng. Labs and Subjects for UG
- CHE Committee member of Accreditation Program of Engineering Accreditation Council (EAC)
- Team member of new Program Sustainable Energy under Chem Eng. Depart
- Project Manager of International Collaboration with Institute and Industries deal research activities with north Indian Universities
- Representative and focal person of UTP MoUs and LOI between UTP and north indian Universities for academic and research collaboration

### **TASKFORCE @ UNIVERSITY/NATIONAL/INTERNATIONAL LEVEL**

- Member of Publication Committee for ICPEAM Conference, 2018, KL, Malaysia
- Technical committee Head for Book Proceeding of ICPEAM 2020 & Session Chair of ESTCON 2020
- Member of Publication Committee for ICPEAM Conference 2022, KL, Malaysia
- Team member of STAR Lab for developing UTP Business Model in 2015
- Team Member for Reimagining Student Enrolment (RiSE) Action Lab at UTP in 2017
- Chair the session for ESTCON Conference 2014, 2016, 2018, 2020, 2022.

### **INVITED KEYNOTE SPEAKER**

- Invited speaker at 1st International Interdisciplinary Science Congress: Young Scholar's Meet (I-ISC-2024) organized by Centre for Interdisciplinary Research in Basic Sciences, Jamia Millia Islamia-9 October 2024
- Joint Adjunct lecture between UPES-Dehradun India and UTP-Malaysia to chemical engineering students: Topic: Role of Chemical engineer in Flow Assurance in oil and gas industry. 13 April 2024.
- Keynote Speaker in RAMSACT-2024: 4th International Conference on Recent Advances in Material Science and Computational Techniques (RAMSACT-2024) Manipal University Jaipur, Rajasthan, Jaipur, India, April 4-6, 2024
- Keynote Speaker in International Conference on Recent Advances in Fundamental and Applied Sciences-**RAFAS 2024**, The School of Chemical Engineering and Physical Sciences, Lovely Professional University-INDIA
- Keynote Speaker in International Conference on Recent Advances in Fundamental and Applied Sciences-**RAFAS 2023**, The School of Chemical Engineering and Physical Sciences, Lovely Professional University-INDIA
- Keynote Speech in PPC & PETROMAT SYMPOSIUM **2023**, The 29th PPC Symposium on Petroleum, Petrochemicals, and Polymers. The Petroleum and Petrochemical College. Chulalongkorn University. Thailand
- Invited Speaker at international webinar on Challenges in Gas hydrate process under CCUS technology development organized by Institute of Contaminant Management, University technology PETRONAS, Malaysia, **2023**.
- Invited Speaker at International Conference on Clean Energy Materials and Technologies (ICCEMT 2023) Jointly organize by UPES-Dehradun and CSIR- Indian Institute of Petroleum (IIP) India on 20th -22 Sept 2023.

Dr. Lal

- Invited Speaker by the School of Chemical Engineering and Physical Sciences, Lovely Professional University-INDIA 6 Dec 2023. Delivered talk on *Importance of Engineering Chemistry in Oil and Gas industry*.

## **PROFESSIONAL DEVELOPMENT PROGRAMM and CERTIFICATION**

- ⇒ In-house Training: Train-the-Trainer Certification Programme
- ⇒ Hybrid Teaching workshop Teaching and Learning Certifications:
- ⇒ Online Distance Learning (ODL) modules
- ⇒ Active Learning (AL) modules
- ⇒ Effective Education Delivery (EED) modules
- ⇒ Online Distance Learning (ODL) System
- ⇒ Out Based come Education (OBE)System
- ⇒ Effective Education Delivery (EED) Methods
- ⇒ Problem Based Learning (PBL) Method
- ⇒ Flipped Learning (FL) Methodology
- ⇒ Engineering Learners through Active Learning (AL)
- ⇒ Developing and Supporting Team based Learning using Cooperative Learning (CL)
- ⇒ Extraordinary Leadership and Performance DNA (eLEAP) Assessment
- ⇒ Outcome Based Education (OBE) System
- ⇒ Leadership skills and Team Building Program
- ⇒ 30 Day Postgraduate Development Programm (Excel Lab)

## **ACADEMICS RESPONSIBILITIES:**

- ⇒ ChE. Department Adjunct Lecturer coordinator
- ⇒ ChE. Department Student mobility program (SMP) coordinator
- ⇒ ChE. Department Coordinator of FYP1 (2016-Conti...)
- ⇒ Supervisor of Final Year Project (FYP)
- ⇒ Supervisor of Engineering Team Project (ETP)
- ⇒ Examiner for SIT (Student internship Training) and SIP (Student internship project)
- ⇒ Reviewer and Examiner of RPD Thesis of MS and PhD students
- ⇒ Chairmen and examiner for MSc Vivia
- ⇒ Mentor of undergraduate students

## **REVIEWER**

- National as well as international thesis examiner
- Book proposal reviewer
- Publications of ICPEAM, ESTCON 2018, Kuala Lumpur, Malaysia
- Publications of ICPEAM, ESTCON 2020, Kuala Lumpur, Malaysia
- Publications of ICPEAM, ESTCON 2022, Kuala Lumpur, Malaysia

## **REFERENCE:**

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**Kind Regards**  
**Bhajan Lal**