1. Personal Details

Chua Kian Jon Ernest
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2. Current Position

Associate Professor, August 2016 – present, Department of Mechanical Engineering, National University of Singapore

3. Employment History

- Associate Professor, August 2016 – present, Department of Mechanical Engineering, National University of Singapore.
- Assistant Professor, August 2009 – 2015, Department of Mechanical Engineering, National University of Singapore, Singapore.
- Senior Lecturer, August 2008 – July 2009, Department of Mechanical Engineering, National University of Singapore, Singapore.
- Lecturer, August 2004 – July 2008, School of Engineering, Intelligent Building Technology, Temasek Polytechnic.
- Teaching/Research Fellow, 2001-2006, Department of Mechanical Engineering, National University of Singapore, Singapore.

4. Academic Qualifications

Degree	University	Period
PhD (Mechanical Engineering)	National University of Singapore	April 2001 – August 1997
MEng (Mechanical Engineering)	National University of Singapore	June 1997 – January 1995
BEng Hons (Mechanical Engineering)	National University of Singapore	June 1990 – July 1994

5. Research interests

Building Energy System and Efficiency; Cooling/Dehumidification Systems and Technologies, Co-generation/Tri-generation/Quad-generation, Membrane Technologies.

6. Publications

- Oh, S. J., Choon Ng, K., Thu, K., Kum Ja, M., Islam, M. R., Chun, W., & Chua, K. J. E. (2016). Studying the performance of a dehumidifier with adsorbent coated heat exchangers for tropical climate operations. Science and Technology for the Built Environment, 1-9.
- Oh, S. J., Ng, K. C., Thu, K., Chun, W., & Chua, K. J. E. (2016). Forecasting Long-term Electricity Demand for Cooling of Singapore's Buildings Incorporating an Innovative Air-conditioning Technology. Energy and Buildings, In-press
- Cui, X., Islam, M. R., Mohan, B., & Chua, K. J. (2016). Theoretical analysis of a liquid desiccant based indirect evaporative cooling system. Energy, 95, 303-312.
- Bui, D. T., Nida, A., Ng, K. C., & Chua, K. J. (2016). Water vapor permeation and dehumidification performance of poly (vinyl alcohol)/lithium chloride composite membranes. Journal of Membrane Science, 498, 254-262.
- Chua, K. J. (2015). Heat and mass transfer of composite desiccants for energy efficient air dehumidification: Modelling and experiment. Applied Thermal Engineering, 89, 703-716.

7. Patents filed

- SG Patent Application: Two Stage Heat Pump Dryer (References 9804812-7 - Intellectual Property Office of Singapore (IPOS)). Filing Date: 12 December 1999
- Regional Patent Application: A Modular Heat Pump System for Drying and Air-Conditioning (References MY–124685-A, TH-054304. Filing Date: 01 December 1999
- New SG Patent Application: A Hybrid Air Dehumidification System for Improved Moisture Removal (References I201309425-5 - Intellectual Property Office of Singapore (IPOS)). Filing Date: 19 December 2013. Patent presently undergoing PCT filing.
- IP Invention Disclosure: Adsorption (AD) and M-Cycle (ADM) for all Weather Cooling (ILO Ref: 13370N - US Provisional Application No. 62/051,453). Disclosure filing date: 30 September 2014.
- IP Invention Disclosure: High performance Composite Membrane for Dehumidification Applications (ILO Ref: 14168N - US provisional application number 62/025,099). Filing Date: 19 December 2014

8. Professional Awards

- IES Prestigious Engineering Achievement Award 2013
- Ministry of National Development R&D Distinguished Award 2015
- IES Prestigious Engineering Achievement Award 2015
- ASEAN Outstanding Engineering Achievement Award 2015
- Applied Energy Award 2016 (Elsevier)
- WSSET (World Society for Sustainable Energy Technology) Innovation Award 2016
- IChemE Award 2016 – Research Project of the Year

9. Research Outcomes

- MIT-SMART Centre Ignition Grant, 'A hybrid air dehumidifier for warm and humid climates' - $50,000.00 from Sep 2011 to January 2013.
  The purpose of this project was to complete a "proof-of-concept" development of a novel, high-efficiency hybrid membrane composite desiccant dehumidification system. The technology combined advanced membranes with unconventional composite desiccant to reduce energy use for air dehumidification compared to conventional cooling systems. Via this project, the first ever hybrid dehumidifier incorporating the desiccant and membrane technology has been developed.

- NRF POC Grant, Energy Efficient Hydrogen Production via a Hybrid Photocatalysis/Electrolysis Process Employing Novel Catalysts' - $242,000.00 from Jan 2012 to Feb 2013
  This project has demonstrated a "proof-of-concept" development of a novel tri-hybrid system comprising photocatalysis, electrolysis and PV. This novel approach significantly enhances the hydrogen/oxygen production rate while using relatively less energy when compared to other conventional methods. So long as there is water (rain/wastewater) and sunlight, our system can efficiently produce hydrogen/oxygen with ease. The secret of this success lies in the components of a new generation of high performing photocatalyts that harness both sunlight and solar heat to produce hydrogen/oxygen.

- A*STAR SERC MND-Green Building Grant, 'A Novel Desiccant/Nano-Woven Membrane Air Dehumidification to Enhance Building Energy Efficiency' - $710,400.00 from March 2012 to Feb 2015
  This proposed work pushed the envelope of heat and mass transfer in developing the next generation of air dehumidifier. The project involved the fundamental development in desiccant sorption kinetics, material science and new nano-porous membrane dehumidification. It covered the fundamental knowledge and methodologies for heat/mass transfer experiments and calculations regarding equilibria, heat effects, desiccant structural modelling, diffusion measurement, and selectivity control. The project was highly multi-disciplinary. It amalgamated expertise in heat/mass transport phenomena, nano-science, photocatalysis and material science. It developed the worlds' most efficient nano-membrane for air dehumidification. Two technology disclosures have been filed. One patent has been granted locally while the other has just been granted a US provisional patent.