

Juin Yau Lim



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💡 ***Passionate sustainable practitioner that seek solutions with modern approaches***

Main Focusses

- Artificial intelligence guided system design.
- Renewable energy systems design and network optimization.
- Process system engineering and industrial resource recovery.
- Circular economy integration and risk mitigation on a given system.
- Wastewater treatment plant modeling and operation.
- Air pollution system upgrade and refinement.
- Treatment targeting municipal solid waste & hazardous waste.

Professional Appointments

Korea University, South Korea

March. 2023 – March. 2024

Research Professor*, Dept. of Life Sciences,

- Led and conducted research topics aligned with the expertise in the group (4 first authored & 4 co-authored).
- Provide research guidance to post-graduate students in the group and initiate research according to each interest.
- Conduct classes and workshops among post-graduate and undergraduate students.

Postdoctoral Research Fellow, School of Business (*accum.*)

- Aimed to focus on analyzing the ESG performance of top 200 companies in South Korea.
- Engage interdisciplinary research under ESG theme between School of Business and Dept of Psychology by conducting workshops on possible usage of life cycle assessment.

*Research Professor (Rep. of Korea) is a non-tenure track research path with severe duty on teaching and supervising students.

Education

Ph.D. in Applied Environmental Science & Engineering

Feb. 2023

Kyung Hee University, South Korea

- Dissertation: *“Comprehensive guidance on the improvement of nationwide renewable energy penetration considering overall sustainability alongside with system reliability: Power-to-X, Microalgae Biorefinery, and Hydrogen”*
- Supervisor: **Prof. Chang Kyoo Yoo**
- CGPA: 4.0/4.3

M.Eng. in Chemical & Environmental Engineering

June 2018

University of Nottingham, Malaysia

- Dissertation: “*Fertilizer Formulation in Oil Palm Plantation with Life Cycle Assessment and P-graph Optimization*”
- Supervisor: **Prof. Hon Loong Lam**
- CGPA: 3.7/4.0

Industrial Experiences

Greenverse Sdn. Bhd. [Research Engineer, Hybrid]

June 2023 – till date

- Lead research initiatives on cutting-edge technologies in hazardous waste management and publish research findings in reputable journals representing Greenverse.
- Participate in the commencement (i.e, Environmental Impact Assessment reporting to local authority) of a large-scale integrated hazardous waste plant in East Coast of Peninsular Malaysia.
- Provide thought leadership on guiding strategic direction of research projects by integrating latest scientific findings with analysis and optimizing the current waste management process.

Nottingham GreenTech [Project Engineer Trainee]

June 2017 – Sept. 2017

- Amend technical drawing (PFD, PID, Isometric) according to plant site.
- Ensure proper operation for the Integrated Anaerobic Aerobic Bioreactor Plant.
- Perform and schedule service and maintenance for the plant. (Equipment and process operation)

BeChem Technologies [Project Engineer Trainee]

June 2016 – Sept. 2016

- Performed technical drawing (PFD, P&ID, Plant Layout, & Equipment Drawing) on AutoCAD.
- Performed on-site checking and hands-on maintenance service on equipment.
- Coordinate at new plant site setup and preparation of Operation & Maintenance Manual.

Industrial Projects

BKT company, South Korea.

Sept. 2020 – Oct. 2022.

- Development of modern nitrogen recovery wastewater treatment plant based on two-stage partial nitrification - Anammox process.

Samsung Display, South Korea.

May 2021 – Dec. 2021

- Assess the performance & analyze reaction kinetics and pathway of combustion chamber under vary operating conditions.

Samsung Electronics, South Korea.

May 2020 – Dec. 2020

- Proposing optimal operating conditions for burning chamber and scrubber in compliance of air discharge limits for the semiconductor industry.

Teaching Experiences

1. Conducted courses & workshops related to theoretical and hands-on experience.

- Life cycle assessment (LCA)
- P-graph hands-on workshop
- Reaction Mechanism Generation (RMG)
- Modeling, optimization, and statistical analysis.

2. Educational class for undergraduate students

- Matlab, Python, P-graph, RMG, GAMS, Wastewater Treatment

Awards & Scholarship

- *Postdoctoral Fellowship* from Korea University, South Korea, 2023 ~ 2024
- *Brain Korea 21+* program scholarship, South Korea, 2019 ~ 2023
- *President Scholarship*, South Korea, 2019 ~ 2021
- *Journal Publication Scholarship*, Kyung Hee University, South Korea (2 times recipient)
- *High Achiever Award for Continuing Personal Development*, Uni. of Nottingham, 2017
- *High Achievers Scholarship*, Uni. of Nottingham, Malaysia, 2014

Skills

Language

- **Native:** English and Chinese
- **Fluent:** Malay, Cantonese, Hokkien, and Hakka
- **Intermediate:** Korean

Computing skills

- **Programming:** MATLAB, Python, GAMS, and P-graph
- **Simulation:** Aspen HYSYS, Aspen Plus, AutoCAD, Simapro, OpenLCA, and GPS-X
- **Microsoft Office:** Word, Excel, and Powerpoint

Others

1. Academic Community

- Youth Editorial Board** (June 2023 – till date). Biochar, Springer. Impact Factor: 12.7 (2022).
- Editorial Board** (March 2024 - till date). Applied Science and Engineering Progress
- Reviewer** (actively available). Reviewed more than 40 articles || Chemical Engineering Journal, Applied Energy, Energy, Trends in Analytical Chemistry, Journal of Cleaner Production & etc.

2. Conference (Hosted)

- a. **Chair of the Local Organizing Committee, (2023).** 15th Japan-China-Korea (JCK) Forum: Co-hosting with 6th Global Conference: ESG Management & Sustainability. 28 to 30 November 2023. Korea University, South Korea.
- b. **Organizing Committee, (2023).** 2023 Global ESG Forum: Pursuing Sustainability through ESG. 26 to 29 June 2023. National University of Singapore, Singapore.

3. Extracurricular Activities

- a. **Squash Club, University of Nottingham**
 - Vice President of Club June '17 - May '18
 - Event Team Leader Nov. '16 - May '17
- b. **Education Network, University of Nottingham**
 - Secretary of Department Representative Sept. '17 - May '18
 - Class Representative, Yr. 4 Sept. '17 - May '18
 - Class Representative, Yr. 3 Sept. '16 - May '17
- c. **Chinese Cultural Society, University of Nottingham** June '17 - May '18
 - Act as Senior Advisor, raised fund for one year's club activities
 - Member of Impromptu Speech Division.
- d. **Student Ambassador, University of Nottingham** June '17 - May '18
 - Representing university in public event: Open Day, Application Day, & Education Fair
- e. **Summer Research Intern, University of Nottingham** June '15 - Sept '15
 - Assisting PhD candidate in research focusing on [PDMS microfluidic devices](#).

4. Volunteering Activities

- a. **Participated Charity Program by [Experian](#)** Aug. '18
 - Autism Cafe Project & Kechara Soup Kitchen
- b. **Global Leader Experiences by [Common Purpose](#)** Sept. '17
 - Participated various leadership programme and charity @ General Electric, Great Heart Charity Association, and Invest KL
- c. **Volunteering Activity by [Blue Sky, Uni. Nottingham](#)** Nov. '16
 - Tutoring programme for refugee kids and organized sports day activity
- d. **Community Service, University of Nottingham** July '15
 - Lead and did mural art painting at a local primary school in Semenyih, Malaysia

Portfolio: Publications and Conferences

Journal Articles & Book Chapter

* **Underlined & bolded** indicates the authorship position; * indicates authors contributed equally

Submitted & In Review

1. **Lim, J.Y.**⁺, Loy, A.C.M.⁺, How, B.S., Sonne, C., Chang, S.X., Ok, Y.S., 202x., Enhancing Future in the Agricultural Industry through Sustainable Digitalization. (*Submitted*)
2. Wang, M.M.K.⁺, **Lim, J.Y.**⁺, Chan, Y.J., Lam, H.L., 202x. Navigating the path to sustainable hazardous waste management for a resilient future projecting Malaysia with smart and innovative solutions. (*Under Review*)
3. Cho, Y.⁺, **Lim, J.Y.**⁺, Igalabithana, A.D., Hwang, G.W., Masek, O., Ok, Y.S., 202x. AI-guided investigation of biochar's efficacy in Pb immobilization for remediation of post-mining contaminated agricultural land. (*Under Revision*)
4. Senadheera, S.S.⁺, Withana, P.A.⁺, **Lim, J.Y.**⁺, Scott, C.X., Wang, F., You, S.M, Rhee, J.H., Ok, Y.S., 202x. Carbon Negative Biochar Systems Contribute to Sustainable Urban Green Infrastructure: A Bibliometric Analysis. (*Under Review*)
5. Cho, Y., Withana, P.A, Rhee, J.H., Lim, ST, **Lim, J.Y.**, Park S., Ok, Ys., 202x. Achieving the sustainable waste management of medical plastic packaging using a life cycle assessment approach. (*Under Review*)
6. Lin, Z.Y., Lee, K.H., **Lim, J.Y.**, Kim J.H., Eun, B., Lee, S.J., Park, J.Y., Oh, JM, 202x, Spatial and Temporal Effect of Industrial Effluent on the Dissolved Organic Matter Quality across Riverine. (*Under Review*)

Accepted & Published

1. Lin, Z.Y., **Lim, J.Y.**, Oh, JM, 2024, Innovative interpretable AI-guided water quality evaluation with risk adversarial analysis in river streams considering spatial-temporal effects. *Environmental Pollution* (*Accepted*)
2. Yuan, X.Z., Manu, S., **Lim, J.Y.**, Javier, P.R., Wang, X.N., Ok, Y.S, 2024. Active Learning based Guided Synthesis of Engineered Biochar for CO₂ Capture. *ACS ES&T*
3. Yuan, X.Z, Li, J., **Lim, J.Y.**, Ashkan, Z., Daniel, A., Wang, Y., Wang, X.N., Ok, Y.S., 2023. Machine learning for heavy metal removal from water: recent advances and challenges. *ACS ES&T Water*
4. Lyu, H.H.⁺, **Lim, J.Y.**⁺, Zhang, Q.⁺, Senadheera, S., Zhang, C.C., Huang, Q.L., Ok, Y.S. 2024, Conversion of organic solid waste into energy and functional materials using biochar catalyst: bibliometric analysis, research progress, and directions. *Applied Catalysis B: Environmental*. 340, 123223.
5. **Lim, J.Y.**, Teng, S.Y., Loy, A.C.M, How, B.S., Heo, S., Jansen, J., Show, P.L., Yoo, C.K., 2023. Interpretable artificial intelligence guided configuration of sustainable coal-fire flue gas treatment under best available technology set. *Environmental Pollution*. 122335.
6. Lo, S.L.Y, How, B.S., Teng, S.Y., **Lim, J.Y.**, Loy, A.C.M, Lam, H.L., Sunarso, J., 2023. A novel hybrid method for constructing resilient microalgae supply chain: Integration of n-1 contingency analysis with stochastic modelling. *Journal of Cleaner Production*. 417, 137939.

7. Loy, A.C.M.⁺, **Lim, J.Y.**⁺, How, B.S., Yiin, C.L., Lock, S.M.S, Lim, L.G., Alhamzi, H., Yoo, C., 2023. Rethinking of the future sustainable paradigm roadmap for plastic waste management: A multi-nation scale outlook compendium. *Science of The Total Environment*. 881, 163458.
8. Foong, S.Y., Chan, Y.H., Yiin, C.L., Lock, S.S.M., Loy, A.C.M., **Lim, J.Y.**, Yek, P.N.Y., Wan, Mahari W.A., Liew, R.K., Peng, W., Tabatabaei, M., Aghbashlo, M., Lam, S.S. 2023. Sustainable CO₂ capture via adsorption by chitosan-based functional biomaterial: A review on recent advances, challenges, and future directions. *Renewable and Sustainable Energy Reviews*. 181, 113342.
9. Heo, S.⁺, **Lim, J.Y.**⁺, Nguyen, H., Vilela, P., Safder, U., Woo, T., Kim, S., Oh, T., Yoo, C., 2023. End-to-end autonomous and resilient operability strategy of full-scale PN-SBR system: From influent augmentation to AI-aided optimal control and scheduling. *Journal of Water Process Engineering*. 53, 103694.
10. Loy, A.C.M., Kong, K.G.H., **Lim, J.Y.**, How, B.S., 2023. Frontier of Digitalization in Biomass-to-X Supply Chain: Opportunity or Threats?. *Journal of Bioresources and Bioproducts*. 8, 101-107.
11. Sahl, A. Bin, Loy, A.C.M., **Lim, J.Y.**, Orosz, Á., Friedler, F., How, B.S., 2023. Exploring N-best solution space for heat integrated hydrogen regeneration network using sequential graph-theoretic approach. *International Journal Hydrogen Energy*. 48, 4943–4959.
12. **Lim, J.Y.**, Teng, S.Y., How, B.S., Nam, K., Heo, S., Máša, V., Stehlík, P., Yoo, C.K., 2022. From microalgae to bioenergy: Identifying optimally integrated biorefinery pathways and harvest scheduling under uncertainties in predicted climate. *Renewable and Sustainable Energy Reviews*. 168, 112865.
13. **Lim, J.Y.** and How BS, 2022. A Comprehensive Guidance on Transitioning Toward Sustainable Hydrogen Network from Localized Renewable Energy System: Case study of South Korea. *Optimization for Energy Systems and Supply Chains*, CRC Press, 73-92.
14. Vilela, P., Safder, U., Heo, S., Nguyen, H.-T., **Lim, J.Y.**, Nam, K., Oh, T.-S., Yoo, C., 2022. Dynamic calibration of process-wide partial-nitrification modeling with airlift granular for nitrogen removal in a full-scale wastewater treatment plant. *Chemosphere*. 305, 135411.
15. Kong, K.G.H., **Lim, J.Y.**, Leong, W.D., Ng, W.P.Q., Teng, S.Y., Sunarso, J., How, B.S., 2022. Fuzzy optimization for peer-to-peer (P2P) multi-period renewable energy trading planning. *Journal of Cleaner Production*. 368, 133122.
16. Heo, S., **Lim, J.Y.**, Chang, R., Shim, Y., Ifaei, P., Yoo, C., 2022. Non-Gaussian multivariate statistical monitoring of spatio-temporal wind speed frequencies to improve wind power quality in South Korea. *Journal of Environmental Management*. 318, 115516.
17. Yap, T.L., Loy, A.C.M., Chin, B.L.F., **Lim, J.Y.**, Alhamzi, H., Chai, Y.H., Yiin, C.L., Cheah, K.W., Wee, M.X.J., Lam, M.K., 2022. Synergistic effects of catalytic co-pyrolysis *Chlorella vulgaris* and polyethylene mixtures using artificial neuron network: Thermodynamic and empirical kinetic analyses. *Journal of Environmental Chemical Engineering*. 10, 107391.
18. Woo, T., Nam, K., Heo, S., **Lim, J.Y.**, Kim, S., Yoo, C., 2022. Predictive maintenance system for membrane replacement time detection using AI-based functional profile monitoring: Application to a full-scale MBR plant. *Journal of Membrane Science*. 649, 120400.
19. **Lim, J.Y.**, Loy, A.C.M., Alhazmi, H., Fui, B.C.L., Cheah, K.W., Taylor, M.J., Kyriakou, G., Yoo, C.K., 2022. Machine learning-assisted CO₂ utilization in the catalytic dry reforming of

- hydrocarbons: Reaction pathways and multicriteria optimization analyses. *International Journal of Energy Research*. 46, 6277–6291.
20. Peter, A.P., Tan, X., **Lim, J.Y.**, Chew, K.W., Koyande, A.K., Show, P.L., 2022. Environmental analysis of *Chlorella vulgaris* cultivation in large scale closed system under waste nutrient source. *Chemical Engineering Journal*. 433, 134254.
 21. Kong, K.G.H., How, B.S., **Lim, J.Y.**, Leong, W.D., Teng, S.Y., Ng, W.P.Q., Moser, I., Sunarso, J., 2022. Shaving electric bills with renewables? A multi-period pinch-based methodology for energy planning. *Energy* 239, 122320.
 22. **Lim, J.Y.**, Orosz, A., How, B.S., Friedler, F., Yoo, C., 2022. Reliability incorporated optimal process pathway selection for sustainable microalgae-based biorefinery system: P-graph approach, in: Yamashita, Y., Kano, *Computer Aided Chemical Engineering (Eds.)*, 14 International Symposium on Process Systems Engineering. Elsevier, pp. 217–222.
 23. Safder, U. ⁺, **Lim, J.Y.** ⁺, How, B.S., Ifaei, P., Heo, S., Yoo, C., 2022. Optimal configuration and economic analysis of PRO-retrofitted industrial networks for sustainable energy production and material recovery considering uncertainties: Bioethanol and sugar mill case study. *Renewable Energy* 182, 797–816.
 24. How, B.S., Orosz, A., Teng, S.Y., **Lim, J.Y.**, Friedler, F., 2021. Heat Integrated Water Regeneration Network Synthesis via Graph-Theoretic Sequential Method. *Chemical Engineering Transactions*. 88, 49–54.
 25. Affery, A.P., Tan, J.X., Ong, I.Y.B., **Lim, J.Y.**, Yoo, C., How, B.S., Ling, G.H.T., Foo, D.C.Y., 2021. Optimal planning of inter-plant hydrogen integration (IPHI) in eco-industrial park with P-graph and game theory analyses. *Process Safety and Environmental Protection*. 155, 197–218.
 26. Loy, A.C.M., **Lim, J.Y.** ⁺, How, B.S., Yoo, C.K., 2021. Blockchain as a frontier in biotechnology and bioenergy applications. *Trends in Biotechnology*. 40 (3), 225-258.
 27. Lo, S.L.Y., Kong, K.G.H., How, B.S., **Lim, J.Y.**, Show, P.L., Sunarso, J., 2021. Techno-economic evaluation of microalgae-based supply chain: Review on recent approaches, in: *IOP Conference Series: Materials Science and Engineering*. IOP Publishing, p. 12026.
 28. Rhee, G. ⁺, **Lim, J.Y.** ⁺, Hwangbo, S., Yoo, C., 2021. Evaluation of an integrated microalgae-based biorefinery process and energy-recovery system from livestock manure using a superstructure model. *Journal of Cleaner Production*. 293, 125325.
 29. Heo, S., Nam, K., Tariq, S., **Lim, J.Y.**, Park, J., Yoo, C., 2021. A hybrid machine learning–based multi-objective supervisory control strategy of a full-scale wastewater treatment for cost-effective and sustainable operation under varying influent conditions. *Journal of Cleaner Production*. 291.
 30. **Lim, J.Y.**, How, B.S., Teng, S.Y., Leong, W.D., Tang, J.P., Lam, H.L., Yoo, C.K., 2021. Multi-objective lifecycle optimization for oil palm fertilizer formulation: A hybrid P-graph and TOPSIS approach. *Resources, Conservation and Recycling*. 166, 105357.
 31. **Lim, J.Y.**, Safder, U., How, B.S., Ifaei, P., Yoo, C.K., 2021. Nationwide sustainable renewable energy and Power-to-X deployment planning in South Korea assisted with forecasting model. *Applied Energy*. 283, 116302.
 32. **Lim, J.Y.**, How, B.S., Rhee, G., Hwangbo, S., Yoo, C.K., 2020. Transitioning of localized renewable energy system towards sustainable hydrogen development planning: P-graph approach. *Applied Energy*. 263, 114635.

International Conferences

- **Juin Yau Lim**, Wai Yin Wong, SangYoun Kim, ChangKyoo Yoo*, Generative AI-assisted functional design of PEMFC flow field channel for the flooding issue, pp.72, *3rd International Symposium on Carbon & Functional Materials For Energy & Environment*, Poster Presentation, DaNang, Vietnam (Feb 2024).
- **Juin Yau Lim**, Unleashing potential of renewable energy from different aspects and highlighting current industrial practice of waste management. Oral Presentation (co-chair session & plenary speaker), *6th International ESG Conferences x JCK Forum*. Seoul, South Korea (Nov 2023)
- **Juin Yau Lim**, Akos Orosz, Bing Shen How, Ferenc Friedler, ChangKyoo Yoo*. Reliability incorporated optimal process pathway selection for sustainable microalgae-based biorefinery system: P-graph approach. *14th International Symposium on Process System Engineering -PSE 2021+*, Kyoto, Japan (June 2022).
- **Juin Yau Lim**, Roberto J. Chang Silva, ChangKyoo Yoo*. An effective guidance of deploying solar and wind energy with multiperiod optimization model considering the geospatial characteristics: A case study of South Korea. *6th Postgraduate Colloquium for Environmental Research 2022 (POCER 2022)*, Physical poster presentation, Langkawi, Malaysia (June 2022).
- **Juin Yau Lim**, ChangKyoo Yoo*, SungKu Heo, TaeSeok Oh, Global sensitivity analysis and multi-objective model calibration study of in-cycle full-scale data-based PN-SBR ASM model. *Korean Society of Environmental Engineering 2021 National Conference*, pp.701-701, poster presentation, Jeju Island, Korea (Nov. 2021).
- **Juin Yau Lim**, Jeongin Kim, SungKu Heo, KiJeon Nam, ChangKyoo Yoo*, Data-Driven Process Integration on Identifying Best Available Technology for Sustainable Air Pollution Controls Aided by P-graph Superstructure Optimization. *PRES21, 24th Conference on Process Integration, Modelling, and Optimisation for Energy Saving and Pollution Reduction*. Oral presentation, Brno, Czech Republic (Oct 2021).
- **Juin Yau Lim**+, Soonho Hwangbo+, KiJeon Nam and ChangKyoo Yoo*, Guidance and sustainable platform to design combined microalgae biorefinery-biogas-hydrogen networks towards nationwide green energy deployment, *12th International Conference on Applied Energy (ICAE2020)*, pp. 116, Oral presentation, Bangkok / Virtual, (Dec. 2020)
- **Juin Yau Lim**, ChangKyoo Yoo*, Research on improving reliability of hybrid renewable energy design. *Korean Society of Chemical Engineers 2020 Conference*, Poster, (Online), p.386 (Oct. 2020)
- **Juin Yau Lim**, KiJeon Nam, ChangKyoo Yoo*, Circular economy assessment towards optimal process configuration of microalgae-based bio-refinery system with consideration of risk analysis and redundancy allocation: P-graph approach. *PRES20, 23rd Conference on Process Integration, Modelling, and Optimisation for Energy Saving and Pollution Reduction*. pp 21, Oral presentation, Xi'an, China (Aug 2020).
- **Juin Yau Lim**, KiJeon Nam, ChangKyoo Yoo*Research on optimization of intermediate storage hub design of optimal biogas supply chain (greenhouse gas and economic evaluation), *Korean Society of Chemical Engineers 2019 Spring Conference*, Poster, Jeju Island, Korea, p.170 (Apr. 2019).

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Renewable Energy

Objective 1

Wind Energy

Objective 2

Microalgae biorefinery

Objective 3

Hydrogen production & utilization

Minor spectrum in applicability of contributing to renewable energy penetration

#1 Increase Renewable Energy Penetration w/ A.I. & Optimization

#2 Vast scale deployment of microalgae biorefinery

#3 Hydrogen production & utilization with hydrocarbons & fuel cell

> Dry catalytic reforming w/ M.L.

> Deep generative design

> Remaining useful life

R.M.G.

Hydrogen Fuel Cell

S. Korea

Incheon

Wind energy: 51,491 MWb

Solar energy: 49,174 MWb

Microalgae cultivation: 290 ha.

Microalgae biorefinery

Microalgae

Cultivation

Harvesting

Post-treatment

Pre-treatment

Lipid extraction

Upgrading

Anaerobic Digestion

Solar radiation

Temperature

PRODUCTION

UTILIZATION

Fuel In

Air In

Excess fuel out

Unspent air, water, and heat

Anode

Electrolyte

Cathode

Hydrogen Fuel Cell

CH₄

C₂H₆

C₃H₈

C₄H₁₀

CO₂

H₂

H₂

H⁺

O₂

H₂O

Time (s)

100

80

60

40

20

0

2000

4000

6000

8000

10000

9