Lawrence Lai

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Education

Massachusetts Institute of Technology (Cambridge, MA; June 2019)

PhD in Chemical Engineering
Thesis Title: Alkylaromatic Reactions in Pyrolysis
Relevant Coursework

- Managerial Finance
- School of Chemical Engineering Practice program
- Patent Law (Harvard Law School)
- Introduction to machine Learning

University of Michigan, Ann Arbor (Ann Arbor, MI; December 2012)

B.S.E in Chemical Engineering
Relevant Coursework

- Environmental and Sustainable Engineering
- Chemical Engineering Process Economics

Research Experience

Massachusetts Institute of Technology, Department of Chemical Engineering, PI: William H Green Lab (Fall 2013 – Present)
PhD Candidate
Research on alkylaromatic reactions in supercritical water and pyrolysis for crude oil upgrading

- Computer aided mechanism generation of alkylaromatic pyrolysis
- Quantum chemistry calculations for thermochemistry and kinetics of alkylaromatic compounds and radicals.
- Experimental work on alkylaromatics using high pressure reactors with supercritical water.
- Maintenance of Gas Chromatography Instrumentation; experienced in 2-dimensional gas chromatography.

University of Michigan – Ann Arbor, Department of Chemical Engineering, PI: Nina Lin
Undergraduate Research Assistant
Research on isobutanol tolerance yielding strains of E.coli for Isobutanol, and potentially biofuel production. (Spring 2011 – Fall 2012)

- Development of multiplex automated genome engineering.
- Biologically engineering of E.coli strain JCL 260 for isobutanol production and disabling mismatch repair system.
- Genetic and phenotypic screening for isobutanol tolerant E.coli strains.

Publications

- **L. Lai**, S. Gudiyella, M. Liu and W. H. Green, “Chemistry of Alkylaromatics Reconsidered,” *Energy & Fuels*, **2018**, 32 (4), 5489-5500.
- S. Gudiyella, **L. Lai**, I. H. Borne, G. A. Tompsett, M. T. Timko and W. H. Green, "An Experimental and Modeling Study of Vacuum Residue Upgrading in Supercritical Water," *AIChE Journal*, **2018**, 64 (5).
- G. Carr, C. A. Class, **L. Lai**, Y. Kida, T. Monrose and W. H. Green, "Supercritical Water Treatment of Crude Oil and Hexylbenzene: An Experimental and Mechanistic Study on Alkylbenzene Decomposition," *Energy & Fuels*, 2**015**, 29 (8), 5290-5302.
- **L. Lai**, S. Khanniche, W. H. Green, “Thermochemistry and Group Additivity Values for Fused Two Ring Aromatic Species and Radicals”, **2018**, in preparation.
- S. Khanniche, **L. Lai**, W. H. Green, “Kinetics of intramolecular Phenyl Migration and cycloaddition in Hexylbenzene Radicals”, **2018** in preparation.

Leadership Experience

Teaching Assistant, 10.26 – Chemical Engineering Lab

- Managed team of 3 students. (Spring 2016)
- Development of ultrasonic pulse detector equipment for nanoparticle size detection.
- Preparation of data analysis algorithm for students using MATLAB.
- Management of student team dynamics.

President of MIT Sport Taekwondo (Spring 2018-Present)
President of Hong Kong Student Society of MIT (Fall 2015-Spring 2018)
Instructional Aide, ChE 343 – Separation Processes (Fall 2012)
Secretary of Omega Chi Epsilon, University of Michigan (Fall 2012)
Director of Social Affairs of the University of Michigan Engineering Council (Engineering Student Government) (Year 2011)

Computer Skills

- Experienced with compiling statistics, solving differential equations and visualizing data on Microsoft Excel.
- Experienced in Python, MATLAB, GitHub, Gaussian 03, C++, and Aspen Plus.

Awards

Jane and Howard M. TenBroeck Scholarship
James B. Angell Scholar
Holly P. Leighly outstanding second-year chemistry student award
CRC Press Chemistry, Freshman award

Languages

Spoken: Fluent in Cantonese Chinese and English; intermediate in Mandarin Chinese
Written: Proficient in English and Chinese