Chuang-Chung (Justin) Lee
CV for R&D or Manufacturing Positions in 2008

Work Address
Massachusetts Institute of Technology
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Education

Massachusetts Institute of Technology, Cambridge, MA
Candidate for PhD in Chemical Engineering, June 2008. GPA: 4.7/5.0
Thesis: Investigation of synaptic plasticity as memory formation mechanism and pathological amyloid fibrillation caused by β-amyloids aggregation: Modeling work combined with experiments.

Massachusetts Institute of Technology, Cambridge, MA
Master's Degree of Chemical Engineering Practice, June 2005. GPA: 4.8/5.0

National Taiwan University, Taipei, Taiwan
Bachelor's Degree in Chemical Engineering, June 2001. GPA: 4.0/4.0
Graduate class rank: 1st out of a class of 110
Thesis: Study of Heterogeneous Nucleation Rate and the Subsequent Induction Period of Calcium Carbonate

Research Experience

MIT Department of Chemical Engineering, Cambridge, MA
Advisor: Prof. Gregory J. Mcrae
A three-stage mechanism consisting of natural protein misfolding, nucleation, and fibril elongation phases was proposed to capture the features of homogeneous fibrillation responses.
A unified model consisting of biological reactions relevant to synaptic plasticity was successfully developed to explain a variety of spike timing dependent plasticity.

National Taiwan University, Taipei, Taiwan
Advisor: Prof. Clifford Y. Tai
Adopted Michaelis-Menten equation to describe the experimental data of induction period and to derive the nucleation rate for the heterogeneous nucleation of calcium carbonate.

Work Experience

Kyowa Hakko Kogyo, Machida-Shi, Tokyo, Japan
Intern. Screened natural product library in search of anti-cancer drugs, using fluorescence of phosphorylated target protein as the marker. Developed statistical programs to facilitate screening process and discovered several hit compounds. The experimental techniques acquired include: Cell culture, RNA transfection, immunofluorescence, Western blotting, protein purification using ion exchange and affinity chromatography, Summer 2007.

General Mills, Minneapolis, MN
Intern. Took measurements of key operational variables and utilized statistical methods to analyze production process. Then optimized operational conditions based on the analysis results to enhance the quality of food products, Spring 2005.

Novartis Pharmaceuticals Corporation, Suffern, NY
Intern. Evaluated spectroscopy as an online tool for measuring physical properties of cardiovascular drug. Afterwards, successful installation of such technology contributed to better quality control of drug tablets at lower labor cost, Spring 2005.

R.O.C. Air Force Headquarter, Taichung, Taiwan
Telecommunication Corporal. Repaired and maintained telephone consoles and wireless walkie-talkies in addition to receiving intensive military training, August 2001-May 2003.

Project Management

Novartis Pharmaceuticals Corporation: "Shift Pharmaceutical Manufacturing Paradigm from Batch to Continuous Processes". Studied various unit operations and developed model-based control system, 2007.

MIT Department of Chemical Engineering Course Project: "Assess the Energy Efficiency of Algae as Biofuel". Acted as a teaching assistant of the course. Guided the project development and coordinated the team work for students, 2007.

US Department of Energy: "The Future of Coal in Greenhouse Gas Constrained World". Utilized Aspen Plus Simulator to evaluate different technologies in efficiency of coal combustion, 2006.

Journal Papers

Lee, C.-C., Poon, C.-S., and McRae, G. J. (2008) "The Unified Theory of Spike Timing Dependent Plasticity", *Nat. Neurosci.*, in preparation.

Lee, C.-C., Anton, M., Poon, C.-S., and McRae G. J. (2007) "The Unified Theory of Homosynaptic Short Term Depression and Facilitation", *J. Neurosci.*, to be submitted.

Lee, C.-C., Nayak, A., Belfort, G., and McRae, G. J. (2007) "A Three-Stage Kinetic Model of Amyloid Fibrillation", *Biophys. J.*, 92(10):3448-3458.

Chien, W.-C., **Lee, C.-C.**, and Tai, C. Y. (2007) "Heterogeneous Nucleation Rate of Calcium Carbonate Derived from Induction Period", *Ind. Eng. Chem. Res.,* 46(20):6435-6441.

Tai, C. Y., Chien, W.-C., Hsu, J.-P., and **Lee, C.-C.** (2001) "Supersaturation, Induction Period, and Metastable Zone Width of Calcium Carbonate System", Chem. Eng. Comm., 188:243-263.

Conference Abstracts

Nayak, A., **Lee, C.-C.**, McRae, G. J., and Belfort, G. (2007) "Fibrillation Kinetics of Recombinant Human Insulin with Osmolytes: Experiments and Kinetic Modeling", ACS Colloid & Surface Science Symposium in Newark, DE.

Sorci, M, Nayak, A., **Lee, C.-C.**, McRae, G. J., and Belfort, G. (2007) "Memory And Reversibility of Insulin Oligomers", SBE's International Conference on Biomolecular Engineering in Coronado Island, CA.

Lee, C.-C., Nayak, A., Belfort, G., and McRae, G. J. (2006) "A Mathematical Model of Amyloid Fibrillation: The Case for Insulin", Biophysical Society Conference in SLC, UT.

Nayak, A., Dutta, A., **Lee, C.-C.**, McRae, G. J., and Belfort, G. (2006) "Insulin Fibrillation Kinetics at Interfaces", AIChE annual meeting in SF, CA.

Honors

Member of Biophysical Society, 2006-2007. MIT Class of 1936 Fellowship, 2003. Honorary member of the Phi Tau Phi Scholastic Honor Society, 2001. Lee Yuan Tze Scholarship for Chemistry, 2000. Presidential Award at National Taiwan University, 1998-2001. Yen Family Scholarship, 1998-1999.

Computer Skills

Mathematic and Statistical tools: Matlab/Simulink, SAS
System Biology Language: JDesigner, System Biology Markup Language (SBML)
Programming: Visual Basic, C++, Fortran
Manufacturing/engineering simulation: Aspen Plus

Language

Chinese (native), English (fluent), Japanese (fluent), and Spanish (intermediate)