

# LI ANG ZHANG

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## Education

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**Doctor of Philosophy, University of Pittsburgh**  
Chemical Engineering

**Pittsburgh, PA**  
August 2017

**Bachelor of Science, Carnegie Mellon University**  
Chemical Engineering, Biomedical Engineering

**Pittsburgh, PA**  
May 2012

## Experience

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### **RAND Corporation**

*Associate Information Scientist*

**Santa Monica, CA**

2017 – present

- ❖ Co-lead for multiple AI/ML projects for Department of Defense sponsors.
- ❖ Developed and assessed adversarial attacks against AI/ML systems to explore their vulnerabilities.
- ❖ Investigated AI/ML opportunities for command and control applications.
- ❖ Implemented satellite image recognition, air combat reinforcement learning, and predictive maintenance systems.

### **University of Pittsburgh**

*Graduate Student Researcher*

**Pittsburgh, PA**

2012 – 2017

- ❖ Designed a compartmental ordinary differential equation model of sepsis (life-threatening inflammation)
- ❖ Discovered clusters of patients exhibiting distinct inflammatory responses (sepsis endotypes)
- ❖ Generated machine-learning tools to identify patient clusters and predict disease start times

### **University of Pittsburgh**

*Undergraduate Student Researcher*

**Pittsburgh, PA**

2010 – 2012

- ❖ Developed models and image processing algorithms to analyze human stem human pancreatic progenitor stem cells.

## Publications

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- ❖ **Air dominance through machine learning: A Preliminary Exploration of Artificial Intelligence–Assisted Mission Planning**  
*LA Zhang, J Xu, D Gold, J Hagen, A Kochhar, AJ Lohn, O Osoba*  
RAND, 2020  
RR-4386  
[Available Online](#)
- ❖ **Operationally relevant artificial training for machine learning: improving the performance of automated target recognition systems**  
*G Hartnett, L Menthe, J Léveillé, D Baveye, LA Zhang, D Gold, J Hagen, J Xu*  
RAND, 2020  
RR-A638-1  
[Available Online](#)
- ❖ **Joint all-domain command and control for modern warfare**  
*SL Lingel, J Hagen, E Hastings, M Lee, M Sargent, M Walsh, LA Zhang, D Blancett*  
RAND, 2020  
RR-4408z1-AF  
[Available Online](#)
- ❖ **Evaluation of repeated quick sepsis-related organ failure assessment measurements among patients with suspected infection**  
*DR Kievlan, LA Zhang, CCH Chang, DC Angus, and CW Seymour*  
*Critical Care Medicine*, 2018  
Vol. 46 No.12 (1906-1913)  
[Available Online](#)
- ❖ **APT-MCMC, a C++/Python Implementation of Markov Chain Monte Carlo for Parameter Identification**  
*LA Zhang, A Urbano, G Clermont, D Swigon, I Banerjee, RS Parker*  
*Computers & Chemical Engineering*, 2017  
[Available Online](#)
- ❖ **Discrete Dynamical Modeling of Influenza Infection Suggests Age-Dependent Differences in Immunity**  
*E Mochan-Keef, LA Zhang, D Swigon, A Urbano, GB Ermentrout, et al.*  
*Journal of Virology*, 2017  
Vol. 91 No. 23 (e395-17)  
[Available Online](#)

- ❖ **A One-Nearest-Neighbor Approach to Identify the Original Time of Infection using Censored Baboon Sepsis Data** *Critical Care Medicine*, 2016  
Vol. 44 No. 6 (e432-442)  
[Available Online](#)  
*LA Zhang, RS Parker, D Swigon, I Banerjee, S Bahrami, H Redl, G Clermont*
- ❖ **High Affinity  $\gamma$ PNA Sandwich Hybridization Assay for Rapid Detection of Short Nucleic Acid Targets with Single Mismatch Discrimination** *Biomacromolecules*, 2013  
Vol. 14 No. 7 (2253-2261)  
[Available Online](#)  
*JM Goldman, LA Zhang, A Manna, BA Armitage, DH Ly, JW Schneider*
- ❖ **Analysis of alternative signaling pathways of endoderm induction of human embryonic stem cells identifies context specific differences** *BMC Systems Biology*, 2012  
Vol. 6 No. 154  
[Available Online](#)  
*S Mathew, M Jaramillo, X Zhang, LA Zhang, A Soto-Gutiérrez, and I Banerjee*

## Presentations

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- ❖ **Sepsis Endotypes and their Physiologic Characterization using Vital Signs** **2017**  
Poster  
Congress of Society of Critical Care Medicine
- ❖ **Sepsis Endotypes Defined by Heat Map Clustering** **2016**  
Oral  
Congress of European Society of Intensive Care Medicine
- ❖ **Identifying Sepsis Endotypes and Time of Onset from Interleukin-6 Trajectories in Septic Shock Patients** **2016**  
Poster  
Congress of European Society of Intensive Care Medicine
- ❖ **Using Vital Signs and a Single Blood-biomarker to Predict Disease Time Zero in Animal Models of Sepsis** **2016**  
Poster  
Congress of Society of Critical Care Medicine
- ❖ **APT-MCMC: Parallel Tempering Markov Chain Monte Carlo with Affine-Invariant Ensemble Samplers for Parameter Fitting** **2015**  
Poster  
Foundations of Systems Biology in Engineering
- ❖ **Identifying Infection Time and Damage from Sepsis Time-Series Data** **2014**  
Oral  
International Conference on Complexity in Acute Illness

## Computer Skills

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- ❖ Advanced knowledge of Markov Chain Monte Carlo simulations
- ❖ Proficient in formulating and solving LP and NLP optimization problems (GAMS, Pyomo, IPOPT, CPLEX)
- ❖ Proficient in Tensorflow for implementing machine learning applications
- ❖ Proficient in Python, R, and Matlab for scientific computing and data analysis/processing
- ❖ Proficient with Linux operating systems
- ❖ Experience in machine learning in Python
- ❖ Code writing in FORTRAN, C++, OpenMP

## Teaching Experience

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### Pardee RAND Graduate School

*Co-Teacher*

Introduction to Blockchain Technology, 5 students 2018

### University of Pittsburgh

*Co-Teacher*

Reactions Engineering, 100 students 2015

*Graduate Teaching Assistant*

Systems Engineering: Dynamics and Modeling, 120 students 2014, 2016  
Reactions Engineering, 90 students

## Awards and Honors

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RAND Bronze Medal Award	2020
RAND PAF Team Innovation Award	2020
RAND Spotlight Award	2018
Best Mathematical Modeling Poster Presentation, <i>McGowan Institute for Regenerative Medicine</i>	2016
Teaching Assistant of the Year, Univ. Pittsburgh <i>Department of Chemical and Petroleum Engineering</i>	2014, 2015
Graduate Assistance in Areas of National Need Fellowship, <i>Department of Education</i>	2013-2014