Ye **Lin**

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Summary

A dedicated Ph.D. Candidate in Systems Engineering, focusing on Single Particle Tracking project involving Data Analysis & Model Simulation, Machine Learning, Optimization, Bayesian Theory, Nonlinear System Identification, Parallel Computation and computational pipeline design.

Education

Boston University — *Boston, MA*

Ph.D. Candidate in Systems Engineering — *Sept. 2017 - Present*

Beihang University — *Beijing, China*

Master of Science in Reliability and Systems Engineering — *Sept. 2015 - June 2017*

Beihang University — *Beijing, China*

Bachelor of Science in Astronautical Engineering, Minor in English Literature — *Sept. 2011 - June 2015*

Skills

Software Engineering Python, MATLAB, R, C, Git, ImageJ

Data Sciences SPSS, SQL, Hadoop, Parallel Computation, High-Performance Computing

Speaking Languages English, Mandarin, Hakka

Experience

Ph.D. Thesis Research on Single Particle Tracking

Boston University

Advisor: Sean B. Andersson (sanderss@bu.edu) — *June 2018 - present*

- Focused on Single Particle Tracking supported by NIH-funded Research Program (1R01GM117039-01A1).
- Built computational pipeline for speeding up computation over 10 times faster, *e.g.*, parallel computation, CPU/GPU allocations, table lookup, etc.
- Reduced computation complexity through mathematical simplification of motion models and measurement models.
- Conducted intensive simulation work for analysis of algorithm performance and efficiency.
- Proposed a method named *Sigma Point based Expectation Maximization* to track the single particle of interest. The method consists of Unscented Kalman Filter, Unscented Rauch-Tung-Striebel Smoother, and Expectation Maximization.
- Made quantitative comparisons among different Single Particle Tracking (SPT) methods, including Gaussian-Fit Maximum Likelihood Estimation (GF-MLE), Gaussian-Fit Mean Square Displacement (GF-MSD), Sequential Monte Carlo-Expectation Maximization (SMC-EM), and Sigma Point based Expectation Maximization (SP-EM). The SMC-EM scheme consists of Particle Filtering, Particle Smoother, and Expectation Maximization algorithm.
- Summarized a high-level generic computation framework for simultaneous localization and parameter estimation in different single particle tracking scenarios, allowing the usage of a wide variety of filtering and smoothing algorithms.

Teaching Assistant for SE/ME 501 - Dynamic Systems Theory

Boston University

By Dr. Jonh Baillieul and Dr. Thedore Djaferis — *Fall in 2019 & 2020*

- Course on State-space Linear Systems (website available here).

Research Rotation on Machine Learning

Boston University

Supervisor: Yannis Paschalidis (yannisp@bu.edu) — *Nov. 2017 – May 2018*

- Applied Proportional Hazards Regression Model (also known as Cox-Regression model) to analyze the influential factors on women's pregnancy based on large amount of clinical data from hospitals. ROC curve is adopted as a criterion to make a quantitative comparison between Cox-Regression model and Logistic Regression model.

Research Practice on Model Simulation

Tsinghua University, Beijing

Supervisor: Liang Ma (liangma@tsinghua.edu.cn)

Nov. 2016 - June 2017

- Focused on simulation work on muscle fatigue models supported by National Natural Science Foundation of China (NSFC), project No.71471095.
- Identified and analyzed physical properties of muscle fatigue and recovery during the process of manual handling operations.
- Conducted 8 simulations by MATLAB/SIMULINK to verify the applicability and feasibility of a three-compartment model, describing muscle activation, fatigue and recovery states under a variety of loading conditions.

Master's Thesis Research on Human Reliability Analysis

Beihang Univeristy, Beijing

Advisor: Xing Pan (panxing@buaa.edu.cn)

Sept. 2015 - June 2017

- Focused on Human Reliability Analysis Method with Cognitive Motivation Models supported by National Natural Science Foundation of China (NSFC), project No.71571004.
- Made an experiment scheme simulating the landing process of pilots who conducted required operations according to Precision Approach Path Indicator (PAPI lamps).
- Designed and made an experiment scheme from five perspectives: Theoretical Statement, Design of Simulation Machine, Questionnaire, Preparation of Field Test, and Data Processing. Based on experimental equipment that we designed for simulating pilot's landing process, we used curve fitting method to calculate a quantitative HEP measurement formula.
- Based on experimental data, we made data analysis to evaluate influential factors on pilots' operating performances.

Publications

- Computationally efficient application of Sequential Monte Carlo expectation maximization to confined SPT
  Ye Lin, Sean B. Andersson. European Control Conference (ECC). 2021
- EM-based Algorithms for Single Particle Tracking of Ornstein-Uhlenbeck Motion from sCMOS Camera Data
  Ye Lin, Sean B. Andersson. American Control Conference (ACC). 2021
- Joint Estimation of Trajectory and Motion Model Parameters in 3D SPT Using the Double-Helix Point Spread Function
  Ye Lin, Fatemeh Sharifi, Sean B. Andersson. Biophysical Journal 120.3 (2021): 188a. 2021
- Simultaneous Localization and Parameter Estimation for Single Particle Tracking in Confined Environments
  Ye Lin, Sean B. Andersson. Grace Hopper Celebration (GHC), Poster Session. 2020
- A Time-Varying Approach to Single Particle Tracking with a Nonlinear Observation Model
  Boris I. Godoy, **Ye Lin**, Sean B. Andersson. American Control Conference (ACC). 2020
- Estimation of General Time-varying Single Particle Tracking Linear Models Using Local Likelihood
  Boris I. Godoy, Nicholas A. Vicker, **Ye Lin**, Sean B. Andersson. European Control Conference (ECC). 2020
- Quantitative Comparison of Single Particle Tracking Algorithms Across Different Signal and Noise Levels
  Ye Lin, Sean B. Andersson. Biophysical Journal 118.3 (2020): 616a. 2020
- Simultaneous Localization and Parameter Estimation for Single Particle Tracking via Sigma Points based EM
  Ye Lin, Sean B. Andersson. 58th IEEE Conference on Decision and Control (CDC). 2019
- Human Error Probability quantification strategy based on modified CREAM
  Xing Pan, Huixiong Wang, **Ye Lin**, et al. Journal of Systems Engineering and Electronics. 2019
- A Two-step Algorithm for Estimation of Time-varying Single Particle Tracking Models Using Maximum Likelihood
  Boris I. Godoy, **Ye Lin**, Juan C. Agüero, Sean B. Andersson. 12th Asian Control Conference (ASCC). 2019
- Investigation of Single Particle Tracking Performance by Different Particle Filter and Smoother Algorithms
  Ye Lin, Sean B. Andersson. Biophysical Journal 116.3 (2019): 139a. 2019
- Experimental Design and Assessment for Pilot's Behavior based on Human Reliability Analysis
  X. Pan, H. Wang, Z. Wu, J. jinag, **Ye Lin**, L.Chen, J.chen. (Chinese patent CN107203835A). 2017
- A Review of Cognitive Models in Human Reliability Analysis
  Xing Pan,**Ye Lin**, Congjiao He. Journal of Quality and Reliability Engineering International. 2016
- Risk Analysis of Equipment SoS Architecture Based on Entropy and Brittleness
  Zhuo Jiang, Xing Pan, **Ye Lin**. 26th European Safety and Reliability Conference. 2016
- Human Reliability of Manufacturing System Based on Integrated THERP and HCR
  Ye Lin, Xing Pan. 13th International Conference on Industrial Management. 2016
- Human Reliability Analysis in Carrier-based Aircraft Recovery Procedure based on CREAM
  Ye Lin, Xing Pan, Congjiao He. 1st International Conference on Reliability Systems Engineering. 2015

Honors & Awards

2019	**Student Traveling Support Award**, 58th Conference on Decision and Control (CDC).	*Nice, France*
2017	**Dean's Fellowship**, Division of Systems Engineering, Boston University.	*Boston, MA*
2016	**First Prize of Academic Scholarship**, Beihang University.	*Beijing, China*
2016	**GuangHua Educational Scholarship**, Beihang University.	*Beijing, China*
2016	**Best Student Paper Award**, 13th International Conference on Industrial Management.	*Hiroshima, Japan*
2015	**Second Prize of Graduate Enrollment Scholarship**, Beihang University.	*Beijing, China*
2014	**First Prize**, International Collegiate Design and Innovation Competition.	*Beijing, China*
2013	**Merit Student**, 2012-2013 academic performance at Beihang University.	*Beijing, China*
2011	**First Prize**, The Chinese Speech Contest in School of Astronautics, Beihang University.	*Beijing, China*

Volunteers

Student Host of Academic Events & Seminars — *Boston, MA*

Center for Information and Systems Engineering (CISE), Boston University — *Jan. 2019 - Present*

- Notify faculty and students about the upcoming events and seminars.
- Schedule meetings for presenters/speakers and faculty/students.
- Prepare necessary materials to ensure everything goes well during presentations.

Virtual Volunteer of American Control Conference — *Denver, CO*

American Control Conference (ACC) 2020 via Zoom — *July 2020*

- Made video backups to guarantee the success of the Zoom meetings.
- Guided attendees to the correct virtual meeting rooms, etc.

Volunteer of International Collegiate Design and Innovation Competition — *Beijing, China*

Beihang University — *July 2015*

- Helped host both opening and closing ceremony of the competition.
- Took photos to preserve valuable memories of participants from different countries of the world.

Team Leader of Volunteers in Earthquake-stricken Area — *Sichuan, China*

Ya'an city — *July 2013*

- Set up a team made up of 11 people to make social service for people in earthquake-stricken area.
- For kindergarten children, introduced the basic structure of rockets and the whole flying process of rockets. Taught children to make rocket models and guided them to launch rocket models by themselves.
- For high school students, held physics courses (Kepler's laws and Newton's law of gravitation, etc.) and a series of Quiz & Activities related to aeronautics and astronautics.
- Made food services for homeless old people.

Teaching Volunteer — *Beijing, China*

Beihang Affiliated Primary School — *Sept. 2013*

- Spread basic scientific knowledge about aerospace and astronautics to primary school students.
- Guided students to make rocket models and taught them the basic knowledge about rocket structure.