

Ye Lin | Clara

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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

Ph.D. Candidate in Systems Engineering

Advisor: Prof. Sean B. Andersson.

Boston, MA

Expected May 2022

Beihang University

Master of Science in Reliability and Systems Engineering

Beijing, China

May 2017

Beihang University

Bachelor of Science in Astronautical Engineering

Minor in English Literature

Beijing, China

Jun 2015

Skills

Software Engineering: Python, MATLAB, C, Git, and ImageJ.

Data Science: Pandas, PyTorch, SPSS, R and SQL.

Languages: English, Mandarin, and Hakka.

Experiences

Single Particle Tracking

Ph.D. Thesis Research, Advisor: Sean B. Andersson (sanderss@bu.edu)

Boston University

Jun 2018 – Present

- Proposed and implemented a variety of filtering and smoothing algorithms with Expectation Maximization to make simultaneous localization and parameter estimation for tracking nanometer-scale biomolecules.
- Conducted computational studies with different algorithms by data-intensive modeling and simulations.
- Applied machine learning techniques to track nanometer-scale biomolecules in challenging conditions.
- Improved the computational efficiency of the proposed algorithms by over 50 times via algorithm design, parallel computation, CPU/GPU scheduling, nested dictionary lookup, interpolation method, etc.
- Reduced computation complexity through mathematical simplification of motion models and measurement models.

Data Analysis & Developer in Finance, Risk, and Treasury

Analyst Internship, Line Manager: Sapna Sardana, Vishwanath Sudabhattula

Barclays Investment Bank

Jun – Aug 2019

- Explored and implemented machine learning algorithms to predict financial information and economic conditions.
- Visualized the dependency relationships among risk, finance, and treasury models using model execution framework.
- Simulated Barclays' business performance over time to support stress-testing projections and medium term planning.

Machine Learning in Pregnancy Clinical Studies

Research Project, Supervisor: Yannis Paschalidis (yannisp@bu.edu)

Boston University

Nov 2017 – May 2018

- Implemented Cox-regression model on large amounts of clinical data to analyze the influential factors on pregnancy. Studied the logistic regression model to predict the pregnancy. The ROC is adopted to make quantitative comparisons.

Model Simulation in Ergonomics

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

Tsinghua University

Nov 2016 – Jun 2017

- Identified and analyzed physical properties of muscle fatigue and recovery process. Conducted 8 simulations using MATLAB/SIMULINK to verify the applicability and feasibility of a three-compartment model (muscle activation, fatigue and recovery states) under different loading conditions.

Human-Machine Interaction in Pilot Behavior Investigation

Master Thesis Research, Advisor: Xing Pan (panxing@buaa.edu.cn)

Beihang University

Jan 2015 – May 2017

- Designed an experiment scheme simulating the landing process of pilots who conduct the required operations according to the Precision Approach Path Indicator (PAPI). Evaluated the influential factors on pilots' operating performances.

Selected Publications

- Three dimensional localization refinement and motion model parameter estimation for confined single particle tracking under low-light conditions ↔
Ye Lin, Fatemeh Sharifi, Sean B. Andersson. Biomedical Optics Express. 2021.
- Expectation Maximization based framework for joint localization and parameter estimation in single particle tracking from segmented images ↔
Ye Lin, Sean B. Andersson. Plos One. 2021.
- Joint estimation of trajectory and model parameters for single particle tracking of three dimensional confined diffusion using the double-helix point spread function (To appear)
Ye Lin, Fatemeh Sharifi, Sean B. Andersson. 19th IFAC Symposium on System Identification. 2021.
- Computationally efficient application of Sequential Monte Carlo expectation maximization to confined single particle tracking (To appear)
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.
- 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.
- 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 SPT models using maximum likelihood ↔
Boris I. Godoy, Ye Lin, Juan C. Agüero, Sean B. Andersson. 12th Asian Control Conference (ASCC). 2019.
- A review of cognitive models in human reliability analysis ↔
Xing Pan, Ye Lin, Congjiao He. Journal of Quality and Reliability Engineering International. 2016.

Volunteers

Student Host of Academic Events & Seminars

Center for Information and Systems Engineering (CISE)

Boston University

Jan 2019 - Apr 2021

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

Virtual Volunteer of American Control Conference

American Control Conference (ACC) 2020 via Zoom

Denver, CO

July 2020

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

Volunteer of International Collegiate Design and Innovation Competition

Beihang University

Beijing, China

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

Ya'an city

Sichuan, China

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

Beihang Affiliated Primary School

Beijing, China

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.

Selected Honors and Awards

Grace Hopper Celebration (GHC) Student Scholarship & Speaker: AnitaB.org, 2021.

Student Traveling Support Award: virtual European Control Conference (ECC), 2021.

Grace Hopper Celebration Student Award: Boston University, 2020.

Student Traveling Support Award: 58th Conference on Decision and Control (CDC), Nice, France, 2019.

Dean's Fellowship: College of Engineering, Boston University, 2017.

First Prize of Academic Scholarship: Beihang University, Beijing, 2016.

GuangHua Educational Scholarship: Beihang University, Beijing, 2016.

Best Student Paper Award: 13th International Conference on Industrial Management, Hiroshima, Japan, 2016.

Second Prize of Graduate Enrollment Scholarship: Beihang University, Beijing, 2015.

First Prize of International Collegiate Design and Innovation Competition: Beijing, 2014.

Outstanding Social Volunteer Team Leader: Beijing, 2013.

First Prize of Chinese Speech Contest: School of Astronautics, Beihang University, Beijing, 2011.

Academic Activities

Grace Hopper Celebration (GHC): poster & speaker, virtual, 2021.

65th Biophysical Society Annual Meeting: poster, virtual, 2021.

American Control Conference (ACC): reviewer, 2020.

Grace Hopper Celebration (GHC): poster & speaker, virtual, 2020.

64th Biophysical Society Annual Meeting: poster, San Diego, 2020.

7th Annual CISE Graduate Student Workshop: oral presentation, Boston University, 2020.

Quantitative BioImaging (QBI) Conference: poster & oral presentation, University of Oxford, UK, 2020.

ME/SE/EC 501 Dynamic Systems Theory: teaching assistant, Boston University, Fall in 2019 & 2020.

Center for Autonomous and Robotic Systems (CARS) Kick off: poster, Boston University, 2019.