Kimberly J. Chan

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Education

University of California, Berkeley — Berkeley, California, USA
Expected Doctor of Philosophy in Chemical and Biomolecular Engineering — *Aug 2019 – Present*
Overall GPA: 3.93/4.0 (5th Year)
Additional coursework listed under Technical Strengths

Georgia Institute of Technology — Atlanta, Georgia, USA
Bachelor of Science in Chemical and Biomolecular Engineering — *Aug 2014 – May 2018*
Minor in Scientific & Engineering Computing (SEC) *coursework listed under Technical Strengths*
Overall GPA: 3.79/4.0

Research Experience

NASA Ames Research Center — Jan 2023 – Present
Pathways Intern – Dr. William J. Coupe — *Mountain View, California, USA*

- Research in geometric machine learning methods for predicting network-level delays to inform decision making during scheduling in air traffic management systems
- Created an integrated software pipeline using open-source Python packages (Kedro, MLFlow) to train and deploy geometric machine learning models and maintained versioning history using Git and Bitbucket

University of California, Berkeley — Jan 2020 – Present
Graduate Research Assistant – Prof. Ali Mesbah — *Berkeley, California, USA*

- Research in machine learning methods for optimal control and statistical forecasting for cold atmospheric plasmas in biomedical applications
- Co-developed a correction strategy for deep neural network-based controllers in complex, nonlinear systems on embedded hardware (FPGAs, specifically), resulting in Publication 1
- Created an end-to-end framework for optimal hyperparameter search for resource-constrained control on hardware using multi-objective Bayesian optimization, resulting in Publication 7
- Continuing work on personalizing plasma treatments using transfer learning and active learning paradigms, resulting in Publications 5, 6

Georgia Institute of Technology — Jan 2017 – May 2018
Undergraduate Research Assistant — *Atlanta, Georgia, USA*

- Simulated experimental models using COMSOL Multiphysics Software to observe transport properties of fluids in porous and reacting media
- Participated in discussion of theoretical applications of metamaterials and nanoscale thermal transport properties

Teaching Experience

University of California, Berkeley - College of Chemistry — Spring 2021, Spring 2022
Graduate Student Instructor – Prof. Jay D. Keasling — *Berkeley, California, USA*

- Worked on a team of 3 to run a process controls and dynamics course (CBE 162) of 60-70 students
- Obtained above average ratings on all aspects of student course evaluations by teaching weekly labs, holding weekly office hours, managing a discussion forum, developing interactive lab assignments, and grading exams
- Awarded Outstanding Graduate Student Instructor for Spring 2022

University of California, Berkeley - College of Chemistry Fall 2019
Graduate Student Instructor – Dr. Negar Beheshti Pour *Berkeley, California, USA*

- Worked with a team of 8 to run an introductory chemical engineering course (CBE 40) of 62 students
- Obtained above average ratings on all aspects of student course evaluations by holding weekly office hours, managing a discussion forum, developing and grading assignments and assessments
- Awarded Outstanding Graduate Student Instructor

Georgia Institute of Technology - Center for Academic Success Aug 2016 – May 2018
Peer Mentor/Tutor *Atlanta, Georgia, USA*

- Coached more than 50 students one-on-one in several subjects including Chemistry, Chemical Engineering, Computer Science, and Math

Georgia Institute of Technology - School of Physics Aug 2015 – May 2018
Undergraduate Teaching Assistant *Atlanta, Georgia, USA*

- Obtained above average ratings on all aspects of student course evaluations by guiding students on hands-on lab assignments, revising existing coding assignments, and mentoring new hires

Technical Strengths

Programming Languages : Python (NumPy, Pandas, Matplotlib, PyTorch, BoTorch, Tensorflow), MATLAB, LaTeX, C, Java

Additional PhD Coursework: Introduction to Machine Learning; Experiential Advanced Control Design I; Deep Reinforcement Learning, Decision Making, and Control

SEC Coursework: Intro to Object-Oriented Programming; Computational Problem Solving; Numerical Analysis; Mathematical Methods in Engineering; High Performance Computing

Publications

7. **K. J. Chan**, J. A. Paulson, and A. Mesbah, "A Practical Multi-Objective Learning Framework for Optimal Hardware-Software Co-Design of Control-on-a-Chip Systems," *Submitted to IEEE Transactions on Control Systems Technology*.
6. **K. J. Chan**, J. A. Paulson, and A. Mesbah, "Safe explorative Bayesian optimization – Towards personalized treatments in plasma medicine," *Accepted at the 62nd IEEE Conference on Decision and Control*, 2023.
5. **K. J. Chan**,† G. Makrygiorgos,† and A. Mesbah, "Towards personalized plasma medicine via data-efficient adaptation of fast deep learning-based MPC policies," In 2023 American Control Conference (ACC), 2023.
4. Y. Bao, **K. J. Chan**, A. Mesbah, and J. Mohammadpour Velni, "Learning-based adaptive-scenario-tree model predictive control with improved probabilistic safety using robust Bayesian neural networks," International Journal of Robust and Nonlinear Control, 2023.
3. Y. Bao, **K. J. Chan**, A. Mesbah, and J. Mohammadpour Velni, "Learning-based adaptive-scenario-tree model predictive control with probabilistic safety guarantees using Bayesian neural networks," In 2022 American Control Conference (ACC), pp. 3260-3265. 2022.
2. D. Rodrigues, **K. J. Chan**, and A. Mesbah, "Data-driven adaptive optimal control under model uncertainty: An application to cold atmospheric plasmas," IEEE Transactions on Control System Technology, 2022.
1. **K. J. Chan**,† J. A. Paulson,† and A. Mesbah, "Deep learning-based approximate nonlinear model predictive control with offset-free tracking for embedded applications," In 2021 American Control Conference (ACC), pp. 3475-3481. 2021.

† denotes equal contribution among authors

Service/Outreach/Mentorship

Reviewer Various, Ongoing

Peer Reviewer

- Learning for Dynamics and Control, 2024
- Conference on Decision and Control, 2023
- American Control Conference, 2023, 2024

Department of Chemical and Biomolecular Engineering Spring 2023, Spring 2024

Faculty Search Committee Graduate Student Member *Berkeley, California, USA*

UC Berkeley Basic Needs Center Aug 2022 – Dec 2022

Food Pantry Volunteer *Berkeley, California, USA*

University of California, Berkeley Aug 2020 – Present

Research Mentor *Berkeley, California, USA*

- Kelci Skinner, Undergraduate student in Chemical and Biomolecular Engineering (August 2022 – Present)
- Shawn Shin, Undergraduate student in Physics (February 2021 – June 2021)
- Mehul Raheja, Undergraduate student in Electrical Engineering and Computer Sciences (May 2020 – May 2021)

Graduate Women in Engineering Aug 2019 – Present

Member, Mentor Buddy *Berkeley, California, USA*

- Served as a “buddy" to mentor and aid a running total of 4 first-year members begin their programs at UC Berkeley; met on a minimum biweekly basis or as-needed

Graduate Student Advisory Committee Jun 2020 – May 2021

Special Projects Webmaster *Berkeley, California, USA*

- Headed special projects involving technical improvements to graduate-student-led programs in the Department of Chemical and Biomolecular Engineering
- Coordinated the development of a web-based solution to connect a running total of 27 undergraduate students with research projects within the department
- Created a communication network of 30-40 students to foster inclusion and discussion with the Asian American and Pacific Islander community within the department

Selected Honors/Awards

- CDC Student Travel Grant, 2023
- ACC Student Travel Grant, 2023
- Outstanding Graduate Student Instructor, Fall 2019, Spring 2022
- Graduate Remote Instruction Innovations Fellow, 2021
- Departmental Fellowship by Tom De Jonghe, 2021
- Women in Chemical Engineering (WIC) Travel Award, 2020 *(virtual conference)*

Presentations

5. **K. J. Chan**, J. A. Paulson,‡ and A. Mesbah, "Towards personalized cold plasma treatments using safe explorative Bayesian optimization," American Institute of Chemical Engineers 2023 Annual Meeting, Orlando, Florida, USA.

4. **K. J. Chan**,‡ J. A. Paulson, and A. Mesbah, "End-to-end design and implementation of robust MPC on resource-limited hardware using multi-objective Bayesian optimization and deep learning," American Institute of Chemical Engineers 2022 Annual Meeting, Phoenix, Arizona, USA.

3. D. Rodrigues,‡ **K. J. Chan**, and A. Mesbah, "Optimal control of dose delivery in atmospheric pressure plasma jets," American Institue of Chemical Engineers 2021 Annual Meeting, Boston, Massachusetts, USA.

2. **K. J. Chan**,‡ J. A. Paulson, and A. Mesbah, "Automated tuning of generic embedded controllers using multi-objective Bayesian optimization," 2022 NorCal Control Conference, Santa Cruz, California, USA.

1. **K. J. Chan**,‡ A. D. Bonzanini, and A. Mesbah, "Embedded deep learning-based robust model predictive control for fast-sampling atmospheric pressure plasma jets using field programmable gate arrays," American Institute of Chemical Engineers 2020 Annual Meeting, San Francisco, California, USA (virtual).

‡ denotes the presenting author