# Alex Ho

Curriculum Vitae
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## RESEARCH INTEREST

Machine learning, Large-Scale Numerical Optimization, Signal Processing, Data Science

## EDUCATION

**UNIVERSITY OF CALIFORNIA MERCED** | Doctoral of Philosophy in Applied Mathematics
Aug 2019 – Present | Merced, California

**UNIVERSITY OF CALIFORNIA MERCED** | Bachelor of Science in Applied Mathematics
Aug 2015 – Dec 2018 | Merced, California

## PROFESSIONAL EXPERIENCE

**COMPUTATIONAL ENGINEERING DIVISION (CED) INTERN** | Lawrence Livermore National Laboratory
Mentor: Dr. Brenda Ng | LLNL Mentor
May 2020 - Aug 2020 | Livermore, California

- Explored GANs to learn meaningful embedding for cyber data, with the end objective of improving host intrusions

**TEACHING ASSISTANT** | University of California Merced
Instructor of Record: Dr. Tommaso Buvoli
Sep 2019 – May 2020 | Merced, California

- Responsible for facilitating for student discussion and provide sections supplementary lecture materials for Calculus II.

**AUTONOMY TECHNOLOGY RESEARCH (ATR) CENTER INTERN** | Air Force Research Laboratory
Mentor: Edmund Zelnio | ATRC Mentor
May 2019 – Aug 2019 | Dayton, Ohio

- Explored and implemented deep learning architectures for solving Air Force problems in the field of remote sensing and autonomy technologies. Fine-tuned hyperparameters of neural network architectures such as DenseNet, ResNet, GoogLeNet, and CycleGan. Collaborated with AFRL researchers and other students from all over the nation.

**STUDENT RESEARCHER** | University of California Merced
Advisor: Dr. Roummel Marcia | Research Advisor
May 2018 – Jan 2019 | Merced, California

- Developed machine learning methods based on stacked autoencoders for separating images that have been superimposed at the detection stage. Implemented approach in PyTorch and tested on customized superimposed MNIST dataset. Investigated different loss functions to improve performance.

Aug 2019 - Present | Merced, California

- Incorporated sparse model in measurement processing for better feature extration or signal extraction in deep learning denoising autoencoder. Computed discrete cosine tranform for the sparsity-induced transformation training and testing dataset.

**UNDERGRADUATE RESEARCH ASSISTANT** | Mechatronics, Embedded Systems and Automation Lab
Mentor: Dr. YangQuan Chen | Research Advisor
May 2017 – Aug 2017 | Merced, California

- Integrated QGroundControl(QGC) and Camera Streaming Daemon to increase flight stability and decrease streaming latency. Responsible for modifying Microsoft Kinects and learning python and C++.

# PROJECTS

**IMAGE DENOISING USING RECURRENT NEURAL NETWORK WITH LIMITED DATA** | Python | Deep Learning
This project, in collaboration with Applied Math professor at UC Merced, is to denoising images by simply using the structure of the network.

**ELECTROENCEPHALOGRAM (EEG) CLASSIFICATION WITH DEEP NEURAL NETWORK** | Python | Deep Learning
This project, in collaboration with the Cognitive Science department of UC Merced, is to process EEG data and perform classification using Deep Learning Algorithms.

**IMAGE DISAMBIGUATION WITH DEEP NEURAL NETWORK** | Python | Deep Learning
Customized Stacked Autoencoders using PyTorch neural network module. Generated training and testing datasets using EMNIST dataset. Loss functions and optimizers were compared for better performance during the training process.

**QGROUNDCONTROL(QGC) CAMERA STREAMING DAEMON STREAMS** | C++
This project is a drone competition project. C++ and Python courses were offered to help new research assistants learn the basics of coding.

# SKILLS

**LANGUAGES**
Proficient:
Python (NumPy, SciPy, Scikit-learn)• Pytorch • MATLAB • Bash
Familiar/Studying:
R • C++

**SPOKEN & WRITTEN**
Fluency:
English • Mandarin
Conversational:
Hokkien

**IDE'S / TEXT EDITORS**
Emacs • Spyder • Jupyter Notebook • Atom

**SOFTWARE / VERSION CONTROL**
Terminal • Git

# PUBLICATION

Alex Ho , J. Alvarez, R. Marcia, "Image Denoising using Recurrent Neural Network with Limited Data", Signal Processing, IEEE ICASSP, 2020 (submitted)

O. DeGuchy, Alex Ho and R. Marcia, "Image Disambiguation with Deep Neural Networks", Applications of Machine Learning, SPIE Optical Engineering + Applications, 2019

# AWARDS

**2019**

- Graduate Student Association (GSA) Travel Award
  - UCM GSA Conference Travels Awards are designed to assist members of the graduate community who travel to conferences to present original work or network as pertinent to their graduate study
- SPIE Student Travel Grant
  - A supplemental travel grant awarded to eligible and selected SPIE student members who are authors, and plan to present and publish an accepted paper at an SPIE meeting
- National Science Foundation NRT Intelligent Adaptive Systems Fellowship Program
  - This program is designed to encourage the development and implementation of bold, new potentially transformative models for STEM graduate education training.
- Best documentation at the 2019 Air Force Research Labs ATR Center Summer Internship Meeting
  - This award is given to interns who has the best documentation of the project.

# PROFESSIONAL PRESENTATION

**2019**

Image Disambiguation with Deep Neural Networks
SPIE Optical Engineering + Applications | San Diego, California

Stacked Autoencoder and Image Processing
SIAM UC Merced Chapter SAMPLe | Merced, California

Image Disambiguation with Deep Neural Networks
Optimization Seminar | Merced, California

## AFFILIATION

2019-Present | Memeber of Deep Learning Group at UC Merced
2019-Present | Member of SPIE: Optics and Photonics
2019-Present | Member of the Optimization Research Group at UC Merced
2018-Present | SIAM - UC Merced Student Chapter