Eric K. Chang

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OBJECTIVE

Enthusiastic about modeling complex dynamic systems and designing control algorithms for mechatronic/robotic/control systems using C++, MATLAB/Simulink, and Python.

SKILLS

Programming Languages: MATLAB, Python, C/C++, JavaScript
Operating Systems: Windows, Linux
Software: Simulink, JIRA, Git, Bitbucket, SVN, ADAMS, SolidWorks, Microsoft Office, Excel, LabVIEW, PyCharm, Visual Studio

WORK EXPERIENCE

Northrop Grumman: Guidance, Navigation, and Control (GNC) Engineer – Dulles, VA *Aug 2020 – Present*

National Team Human Landing System (HLS – Transfer Element) | Cygnus NG-16 | GEO Spacecraft

- Analyzed Monte Carlo Simulations for Rendezvous, Proximity, and Operations and Docking (RPOD), Delta-V, and Attitude Hold maneuvers to optimize GNC flight software (FSW) performance. Scenarios included Descent Element **(Blue Moon Lander)!**
- Redesigned **Monte Carlo** Tool in Python to create parameter (e.g. mass, orbit, thruster, LIDAR) perturbations for satellite simulations and to improve tool runtime efficiency.
- Upgraded Reaction Wheel (RWA) Emulator/Simulator to be substitute for Flight HW (dynamic, temperature models) to mitigate effects on 6 GEO Spacecraft testing schedules.
- Programmed/Streamlined over 30+ technical performance measure scripts in MATLAB and C++ to evaluate GNC FSW performance (attitude control, target pointing, Kalman Filtering)
- Championed agile/lean SW development framework by creating MATLAB parsing/utility scripts to improve GNC Verification suite
- Introduced **plume impingement model** to satellite simulation by processing Direct Simulation Monte Carlos
- Reconfigured Monte Carlo tool for new thruster configuration to facilitate future Cygnus Commercial Resupply Mission analyses
- Mission Operator and GNC analyst for Cygnus NG-16 Commercial Resupply Mission (**Launch Operation**)
- GEO Cognizant Engineer for Integration/Testing/**HIL** experience with Star Trackers (STA), Coarse Sun Sensors (CSS), Reaction Wheels (RWAs), and IMUs (e.g. upgrading HIL simulation testing environment for GEO Spacecraft, FSW Patches)

The Boeing Company: Mechanical/Hydraulic Actuation Systems Engineer - Everett, WA *Aug 2019 – July 2020*

- Developed kinematic model and performed static analysis of truck position actuator forces for 747, 767, and 777
- Provided cost-savings recommendations for Nose Landing Gear Door Design by developing multi-body ADAMS load analysis model
- Updated 25 year's worth of 767/777/777X electromechanical actuation components (25+ parts) drawings/test procedures to latest Boeing standards/requirements/GD&T

University of Michigan: Control Theory Graduate Student Instructor - Ann Arbor, MI *Jan 2018 - May 2019*

- ME 561: Enhanced student's understanding of Digital Control Systems by developing computational and Simulink Homework
  - Taught discrete-time domain classical control concepts (bilinear transformation, root locus, phase margin, and gain margin)
- ME 360: Reinforced modeling, analysis and control of dynamic electromechanical systems concepts (e.g. **System Identification**, Bode Diagrams, Classical Controllers, State-Space Representation) by developing tests and MATLAB/Simulink tutorials for over 100 students)

PROJECT EXPERIENCE

Malaria Detection Project (Computer Vision (CV))

- Designed Convolutional Neural Network (CNN) for detecting malaria with 95% accuracy in cell using Python (Libraries: OpenCV, Tensorflow)
- Analyzed performance of CV techniques like data augmentation, transfer learning, and various NN on malaria detection

EDUCATION

University of Michigan, Ann Arbor

Master of Science in Mechanical Engineering — Concentration: Controls — *May 2019*
Coursework: Control Systems Analysis/Design, Robot Kinematics/Dynamics, Vehicle Dynamics, Linear Feedback Control (LQG, LQR, Observer), Embedded Control Systems, Linear Systems Theory — *GPA: 3.761/4.0*

Bachelor of Science in Mechanical Engineering — *December 2017*
Summa Cum Laude — *GPA: 3.799/4.0*
Minor: Electrical Engineering