Han Hsun Lu

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I am a M.S. student seeking a full time position on aerospace systems. I am experienced in both aircraft and spacecraft system identification, controller design, and stability analysis. My previous work focused on spacecraft modeling and simulation, and my current research is on UAS applications and flight tests.

EDUCATION

Master of Science, expected graduation May 2017
Texas A&M University, College Station, TX
Thesis: Online System Identification on Small UAS
Field: Aerospace Engineering
Advisor: Dr. John Valasek

Master of Science, January 2014
National Cheng Kung University (Taiwan)
Thesis: Robust Controller Design of a Spinning Thin Membrane
Field: Engineering Science
Advisor: Dr. Jer-Nan Juang
GPA: 4.0
Class Rank: 3/46

Bachelor of Science, June 2012
National Cheng Kung University (Taiwan)
Field: Engineering Science
GPA: 3.46
Class Rank: 10/71

ENGINEERING PROJECTS

UAS Precision Agriculture September 2015-Present
Sponsor: Texas A&M College of Engineering and College of Agriculture
Using fixed wing small and medium sized UAS to carry multiple sensors for vegetation monitoring and data collection in collaboration with Agriculture and Electrical Engineering laboratories. Modify and design aircrafts for different payloads including DSLR, multi-spectral NIR, hyper-spectral, LIDAR and infrared sensors. My contributions to the research were flight planning, sensor tuning, image geo-tagging, test planning, DGPS implementation and ground control operator (GCS).

Air Data Acquisition and System Identification on UAS June 2016-Present
This research involves both hardware and software development for system identification on UAS systems. My contributions to the research are to build the high frequency data acquisition system with the ability of directly measuring angle of attack (AOA) and sideslip angle, and to analyze acquired data with both linear and nonlinear system identification methods. The goal is to have the capability to do real-time system identification and controller design.

Tailless Aircraft Controller Assessment January 2016-Present
Sponsor: Air Force Office of Scientific Research
This research involves assessment of the controllability of a tailless aircraft with a goal to design controller using a 55 inch F/A-18E Hornet UAV with 360 degree thrust vectoring jet. The methods include Simulink modeling, wind tunnel testing, and actual flight test demonstration of a tailless F/A-18E UAV. My contributions on this project includes Simulink modeling and system identification and will further on contribute to the controller design.

Heliogyro Spinning Solar Sail August 2012-August 2014
Sponsors: NASA Langley Research Center
National Institute of Aerospace

NCKU Graduate Research Grant

A next generation solar sailing concept exhibition project using solar pressure as main propulsion. My Contribution was to develop a discrete time model for the flexible dynamics and apply linear system identification to analyze the mode shapes of the structure and furthermore identify an envelope ensuring stability. The second focus of my research was to apply controllers to control the flexible blade, a model based predictive controller was shown in simulation with the ability to stabilize the system and provide good performance.

Optimized Application and Practice of A* Algorithm for Path Planning August 2011-August 2012

Sponsor: Ministry of Science and Technology, Taiwan

Developed a bidirectional path planning algorithm reducing the open and closed nodes searched. The algorithm was implemented on a rover car and an Android cell phone for path finding.

Educational Platform Using Cloud Computing and System Engineering Methods May 2012-August 2012

Lead a team of 4 to use Google GAE to develop a cross campus educational purpose platform. My contributions are writing the main Python code and lead the team. The webpage have been used by more than 1000 students in 5 different schools and has more than 45000 visits.

EXPERIENCE

Graduate Research Assistant September 2015-Present

TEXAS A&M AEROSPACE ENGINEERING

- TA for undergraduate courses - 422 Active Control for Aero Vehicle
- Actively participate in various research projects with responsibilities including
  - Aircraft controller design using Matlab/Simulink
  - Aircraft system identification analysis
  - Data acquisition and embedded systems design
  - UAS flight test mission planner and ground control handler
- Mentoring undergraduate researchers

Exchange Scholar August 2012-July 2013

NASA LANGLEY RESEARCH CENTER

- Modeling and simulation of a flexible spacecraft structure using Matlab/Simulink
- System identification and nonlinearity assessment of a solar sail beam using OKID/ERA
- Conduct experiments with laser vibrometer in a 8-foot vacuum chamber
- Model based predictive control on a solar sail blade

Graduate Research Assistant June 2012-January 2014

NATIONAL CHENG KUNG UNIVERSITY

- TA for graduate courses – Applied System Identification, Applied Control
- Lead the Systems Control Lab
- Conduct research and write research proposals/reports

Summer Intern

NATIONAL CENTER OF HIGH-PERFORMANCE COMPUTING June 2011-Aug 2011

- Webpage design and database development using Google GAE, with Python, HTML and Javascript

LEADERSHIP

- **President** of NCKU FCS Alumni Association June 2010-June 2011
- **Delegate** of NCKU June 2010-Dec. 2010
- **Project Lead** of Systems and Control Lab at National Cheng Kung University on heliogyro solar sail January 2012-Aug. 2014

PROFESSIONAL ORGANIZATIONS

- The American Institute of Aeronautics and Astronautics (AIAA)
- The Institute of Electrical and Electronics Engineering (IEEE)

SKILLS

- Proficient in MATLAB, Simulink, LaTex, Mathematica, Python, Microsoft Excel, and Word.
- Knowledge of C++, C, Java, Javascript, HTML.
- Knowledge of Solidworks, Labview, Ansys, QUARTUS, Android API, and Mavlink.
- Experience in managing team projects.
- Bilingual in Chinese.
- Basic reading and speech in Japanese.

RESEARCH INTERESTS

- Modern control design
- System identification
- Vibrational modal analysis
- Embedded systems

SELECTED COURSES

- Spacecraft Dynamics
- Modern Control for Aerospace Systems
- Dynamics of Aerospace Systems
- Estimation of Dynamical Systems
- Theory of Fluid Mechanics
- Stochastic Process
- Applied System Identification
- Fundamental System Engineering
- Robust Control
- Mechanics of Vibrations

PUBLICATIONS

- **Co-Author**, "Infrastructure Assessment with Small Unmanned Aircraft Systems" submitted to IEEE Int. Conf. on Unmanned Aircraft Systems, VA, USA, 2016.
- **M.S. thesis**, Robust Control of a Spinning Thin Membrane, Taiwan, Feb. 2014
- **First Author**, "Adaptive Control of a Heliogyro Membrane Blade" in 13th European Conference on Spacecraft Structures, Materials and Environmental Testing, Braunschweig, Germany, Apr. 2014.
- **Second Author**, "Challenges Associated with System Identification and Control of a Heliogyro Membrane Blade", in 3rd International Symposium on Solar Sailing, Glasgow, Scotland, Jun. 2013.