Junjie Shen

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EDUCATION

Doctor of Philosophy

University of California, Los Angeles (UCLA), California, USA   *09/2016-Present*

Department of Mechanical and Aerospace Engineering (MAE)

Robotics & Mechanism Laboratory (RoMeLa)   *09/2016-Present*

Major in Mechanical Engineering – Systems and Control

Overall GPA: 3.92/4.0

Bachelor of Science

Shanghai Jiao Tong University (SJTU), Shanghai, China   *09/2012-08/2016*

University of Michigan-Shanghai Jiao Tong University Joint Institute (UM-SJTU)

Major in Mechanical Engineering

Overall GPA: 3.70/4.0 (Ranking: 3/61) | Major GPA: 3.94/4.0

Freshman GPA: 3.48/4.0 | Sophomore GPA: 3.72/4.0 | Junior GPA: 3.93/4.0 | Senior GPA: 3.86/4.0

TOEFL: 104 | GRE: V153+Q170+AW4.0

PUBLICATION

J. Zhang, Y. Ding, **J. Shen**, H. Zou, and P.S. Huang, "*Large-Stroke Piezo-Actuated Planar Motor for Nanopositioning Applications*," Precision Engineering. Rejected.   *12/2014*

PRESENTATIONS

- **J. Shen**, "*Design of Spreading Powder Device of Selective Laser Sintering Machine*," Innovation Practice Program, SJTU.   *11/2015*
- **J. Shen**, "*Autonomous Quadrotor Attitude Control using Reinforcement Learning*," Participation in Research Program, SJTU.   *10/2014*
- **J. Shen**, "*Design of Virtual Blind Stick*," Second Shanghai Mechanical Engineering Innovation Competition, SJTU.   *10/2013*

RESEARCH EXPERIENCE

Design and Control of Novel Quadcopter with Variable Pitch

Research Assistant, Supervisor: Dr. Dennis Hong   *02/2017-Present*

- Designed and manufactured a novel quadcopter with variable pitch
- Testing with different control algorithms

Design of Spreading Powder Device of Selective Laser Sintering Machine

Research Assistant, Supervisor: Dr. Huan Qi   *02/2015-11/2015*

- Designed a spreading powder device including ram-cylinder system, feeder system, air & powder supplying system, and structure constitution
- Analyzed the accuracy of powder-laying and the impact of its precision on SLS (Selective Laser Sintering) forming quality
- Optimized the structure design of spreading powder device based on extensive testing

Large-Stroke Piezo-Actuated Planar Motor for Nanopositioning Applications

Research Assistant, Supervisor: Dr. Peisen Huang   *03/2014-03/2015*

- Analyzed the drawbacks of conventional planar motor systems (electromagnetic planar motors,

ultrasonic planar motors, piezo-walking positioning stages, and stick-slip planar motion stages)
- Optimized the motor structure based on dynamic analysis and built three kinds of operating modes to make the planar motor have the characteristics of large motion range and high motion resolution
- Developed an active planar encoder as a feedback system to evaluate the motion performance of the planar motor (motion resolution, maximum motion speed, and trajectory tracking accuracy)
- Demonstrated the motion performance of the planar motor by experimental data

Autonomous Quadrotor Attitude Control using Reinforcement Learning
Research Assistant, Supervisor: Dr. Chengbin Ma   *02/2014-10/2014*
- Studied the deficiency of conventional PID/LQR controller and its influence on quadrotor attitude stabilization
- Developed a state-of-art reinforcement learning algorithm (called Policy Gradient via Signed Derivative) and applied it to the control system of quadrotor attitude stabilization
- Implemented the algorithm as a model-free, online controller tuning procedure to improve the controller performance
- Wrote simulation programs and validated the control strategies first in X-Plane and then in reality

SELECTED PROJECTS
MAE, UCLA   *09/2016-Present*
- Rocket Launch Optimization
- Design of Lamp Structure with Adjustable Light Focus
- Missile State Estimation
- Calibration of an Accelerometer Using GPS Measurement

UM-SJTU Joint Institute, SJTU   *09/2012-08/2016*
- Simultaneous Localization and Mapping – Low-cost Solution Based on HUAWEI P9
- Measurement of Propeller Lift Force
- Research on the Kinematics of Walking Machines Based on Simplified Leg Structures
- Design of Kitchen-Cabinet Structure
- Mechanical Hands & Multi-functional Flash Disk
- Design of Virtual Blind Stick

INDUSTRIAL EXPERIENCE
FCA Asia Pacific Investment Co., Ltd., Cost Engineering Manager Assistant   *02/2016-05/2016*
- Developed micro standards for key commodities
- Developed databases for all cost data within the VCE (Vehicle Cost Engineering) area
- Supported Senior Manager gathering proper regional material and processing data for CEM (Cost Engineering Model) tool

Shanghai HRSTEK Co., Ltd., Mechanical Engineer Assistant   *08/2015-09/2015*
- Assisted in hardware driver construction and maintenance of EOD (Explosive Ordnance Disposal) mobile robots
- Trained in real-time troubleshooting techniques including electrical, mechanical, and pneumatic functions of the manipulator, control cabinets, and PLC (Programmable Logic Controller) interconnections

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TEACHING ASSISTANT EXPERIENCE

Graduate Teaching Assistant, Instructor: Dr. Dennis Hong   *Fall2017/Fall2018/Fall2019*
UCLA MAE 263A: Kinematics of Robotic Systems
- Held weekly discussions and office hours
- Assisted in designing course materials as well as grading of assignments, exams and reports
- Assisted in grading of assignments and exams

Undergraduate Teaching Assistant, Instructor: Dr. Jane Shevtsov   *Spring2020*
UCLA LS 30B: Mathematics for Life Scientists
- Held weekly lab sections and office hours as well as created problem set solutions
- Assisted in grading of assignments and exams

Undergraduate Teaching Assistant, Instructor: Dr. Jukka Keranen   *Winter2020*
UCLA LS 30B: Mathematics for Life Scientists
- Held weekly lab sections and office hours as well as created problem set solutions
- Assisted in grading of assignments and exams

Undergraduate Teaching Assistant, Instructor: Dr. Sharmila Venugopal   *Spring2019*
UCLA LS 30B: Mathematics for Life Scientists
- Held weekly lab sections and office hours as well as created problem set solutions
- Assisted in grading of assignments and exams

Undergraduate Teaching Assistant, Instructor: Dr. Michael Andrews   *Winter2019*
UCLA LS 30A: Mathematics for Life Scientists
- Held weekly lab sections and office hours as well as created problem set solutions
- Assisted in grading of assignments and exams

Undergraduate Teaching Assistant, Instructor: Dr. Jason L. Speyer   *Spring2017/Spring2018*
UCLA MAE 171A: Dynamic System Control I
- Held weekly discussions and office hours as well as created problem set solutions
- Assisted in grading of assignments and exams

Undergraduate Teaching Assistant, Instructor: Dr. Abdon Sepulveda   *Winter2018*
UCLA MAE 166C: Design of Composite Structures
- Held weekly discussions and office hours as well as created problem set solutions
- Assisted in grading of assignments and exams

Undergraduate Teaching Assistant, Instructor: Dr. Chien-Pin Chen   *Fall2015*
UM-SJTU VM320: Fluid Mechanics
- Held weekly lecture review sessions and created problem set solutions
- Assisted in grading of presentations and reports
- Served as a CLT (Center for Learning and Teaching) volunteer in the JI TA Orientation Conference

Undergraduate Teaching Assistant, Instructor: Dr. Yunlong Guo   *Spring2015*
UM-SJTU VM240: Introduction to Dynamics and Vibrations

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- Led recitation sessions and held office hours for individual tutoring every week
- Graded homework and exam papers under the direction of the instructor
- Achieved JI Basic Teaching Assistant Certificate

SKILLS

- **Laboratory**: CNC Machine, 3D Printer, Laser Cutting Machine, Drilling Machine, Electric Soldering Iron, Grating Encoder, Function Generator, Oscilloscope
- **Software**: LaTeX, LabVIEW, Microsoft Visual Studio, MATLAB, Mathematica, Origin, AutoCAD, SolidWorks, UG, Microsoft Office
- **Programming Language**: C/C++, VB, LabVIEW, MATLAB, Python

AWARDS & HONORS

- IROS Best Paper Award on Safety, Security, and Rescue Robotics in memory of Motohiro Kisoi
  11/2019
- JI Distinguished Academic Achievement Award (top 2%) *12/2015*
- National Distinguished Student Scholarship (top 0.2% Nationwide) *10/2015*
- CLT-JI Excellent Volunteer Certificate *09/2015*
- CLT-JI Basic Teaching Assistant Certificate *08/2015*
- SJTU Outstanding Scholarship (top 10%) *2013/2014/2015*
- Dean's List *2013/2014/2015*