

# Zhonghe Jiang

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## EDUCATION

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### Imperial College London (2018-2019)

MSc Control Systems - Provisional mark: 81/100

### City, University of London (2016-2018)

BEng Electrical & Electronic Engineering (Avionics & Control) - Overall mark: 92/100

**Award:** Dean's scholarship for academic excellence (30% reduction in tuition fees)

### Nanjing University of Aeronautics and Astronautics (2014-2016)

BEng Automation Engineering (Avionics & Control) - GPA: 4.1/5.0

**Award:** First Class Scholarship for Outstanding Student at NUAA

## RESEARCH EXPERIENCE

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### Robot Intelligence Lab (2018-2019), Imperial College London

*MSc project: Model Predictive Control for Gait Pattern Generation of Bipedal Walking Robot SLIDER.*  
*Supervisor: Petar Kormushev*

- Created an urdf file for robot modelling.
- Modified the existing walking pattern generator written in C++ so that it can be reused for our robot SLIDER. Linear inverted pendulum model and preview control are used for motion planning. The gait can be regenerated to recover from push in the y direction by solving a nonlinear program.
- ROSified the C++ code so that it can interact with Gazebo through ROS.
- Added a virtual IMU and designed the state estimation for the location of centre of mass.
- Developed a geometric method to solve the inverse kinematics for the novel ankle design.
- Implemented an operational space controller in C++, where Eigen is used for linear algebra, Pinocchio is used for multibody dynamics computation and qpOASES is used as QP solver.

### Research Centre for Systems & Control (2017-2018), City University of London

*Final year project: Modelling, Simulation and Control System Design of Rotary Inverted Pendulum.*  
*Supervisor: Stathis Milonidis*

- Developed a mathematical model of a real rotary inverted pendulum using Lagrange's equations of motion.
- Estimated the damping coefficient of the pendulum by joint estimation of system states and parameters using Extended and Unscented Kalman filter. The moments of inertia in the model was estimated using Simulink Design Optimization in MATLAB.
- Built two simulation models using Simulink and Simscape respectively.
- Designed a linear state-feedback controller via LQR to balance the pendulum at the inverted position using Control System Toolbox in MATLAB.
- Designed a hybrid controller implemented in a STM32 microcontroller for controlling the pendulum to swing up from downward position to its upright position and keeping it balanced.

## STUDENT COMPETITION

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### MathWorks Minidrone Competition at MATLAB EXPO 2019 UK

- Designed a line follower algorithm for a minidrone using Simulink. Especially, focused on the design and implementation of the path planning algorithm using Stateflow in Simulink.