

# WENBIN XU

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## EDUCATION

**Shanghai Jiao Tong University (SJTU), China**

Sep. 2015 – Jul. 2019 Expected

Major in Mechanical Engineering, Minor in Computer & Application

Overall GPA: **3.86/4.00** (91.33/100), Major GPA: **3.86/4.00** (91.66/100)

Ranking: **1/59**

TOEFL: 104 (R28+L24+S23+W29), GRE: 324 (V154+Q170+AW4.0)

## PUBLICATIONS

[1] **W. B. Xu**, X. D. Li, W. D. Xu, L. Gong\*, *et al.*, "Human-robot Interaction Oriented Human-in-the-loop Real-time Motion Imitation on a Humanoid Tri-Co Robot," *3<sup>rd</sup> International Conference on Advanced Robotics and Mechatronics (ICARM)*, NUS, Singapore, 2018. **To Appear**

[2] **W. B. Xu**, X. D. Li, L. Gong\*, Y. X. Huang, *et al.*, "Natural Teaching for Humanoid Robot via Human-in-the-loop Scene-motion Cross-modal Perception," *Industrial Robot*. **Submitted**

[3] **W. B. Xu**, C. J. Liu, C. Q. Zhou, Z. Y. Zhou, H. Mao\*, "Scalable Production of Nitrogen-doped Carbons by Pyrolysis of Biomass-derived Carbons in NH<sub>3</sub> Gas," *22<sup>nd</sup> International Symposium on Analytical and Applied Pyrolysis*, Kyoto, Japan, 2018. **Conference Abstract**

[4] C. Q. Zhou, C. J. Liu, **W. B. Xu**, X. M. Chen, Z. Y. Zhou, H. Mao\*, F. Qi, "N-doped Carbon-Silica Composite Confined Pd Nanoparticles for Abatement of Methane Emission from Automobiles," *Topics in Catalysis*. **Submitted**

## HONORS & AWARDS

China National Scholarship (**Top 1%**)

2016, 2017

Outstanding Student in School of Mechanical Engineering (**Top 10%**)

2016, 2017

Three Good Student of Shanghai Jiao Tong University (**Top 10%**)

Oct. 2016

Honorable Mention of Mathematical Contest in Modeling (**Top 30%**)

Apr. 2017

Robomaster 2017, First Prize in Eastern Division (**3/29**)

Jun. 2017

Excellent Student Cadre of Shanghai Jiao Tong University (**Top 2%**)

Oct. 2017

Tang Lixin Scholarship (**2/422**)

Dec. 2017

## RESEARCH EXPERIENCE

**Preparation of Catalysts for Lignocellulosic Biomass Conversion**

Shanghai, China

Research Assistant

Jan. 2018 – Present

Advisor: Assistant Professor **Ma Hao**, Combustion and Energy Research Group

- Synthesize Oxygen-containing Carbons (OCs) by hydrothermal treatment of glucose solution.
- Introduce metal ions to OCs by incipient wetness impregnation with a solution of a proper concentration.
- Pyrolyze OCs in NH<sub>3</sub> with lower temperatures than existing methods to prepare N-doped Carbons (NCs).
- Characterize NCs with XPS, BET and SEM and catalyze hydrolysis of cellulose to verify catalytic activity.

**Humanoid Robot 3D Prototyping and Ultra-numerous DOF Control**

Shanghai, China

Research Assistant

Oct. 2016 – Jun. 2018

Advisor: Associate Professor **Liang Gong**, Institute of Mechatronics and Logistic Equipment, SJTU

- Assemble a humanoid robot using open-sourced STL files with modifications through 3D printing.
- Perform IK for given gestures or targets and transfer trajectory arrays to slave controller through a protocol.
- Develop URDF files to visualize computed motions on a humanoid model in RVIZ through ROS.
- Develop a fast mapping algorithm to convert euler angles in BVH format into robot joint angles.
- Project live video from a camera onto VR glasses and capture eye-body-synergic human motion through 16 wearable IMUs to realize real-time imitation of upper limb's motion on a humanoid.

**Flight Control System Based on Sensors and CPU in Smartphone**

Shanghai, China

Independent Researcher

Oct. 2015 – Oct. 2016

Advisor: Assistant Professor **Junqi Wu**, School of Aeronautics and Astronautics, SJTU

- Develop self-balancing algorithm of single-rotor based on PID control and extend it to quadrotor platform.

- Simulate quadrotor motion in Gazebo and AirSim using modified source code PX4 or an offboard API.
- Use Raspberry Pi to communicate with Pixhawk through Mavros to control quadrotor attitude and position.
- Have a quadrotor follow the manipulator automatically according to GPS obtained from a smartphone.

## SELECTED PROJECT

**Trajectory Planning and Control of a Rotorcraft | Project Leader** Shanghai, China

Advisor: Associate Professor **Ye Ding**, Robotics Institute, SJTU Mar. 2018 – Jun. 2018

- Generate optimal spatial trajectories based on non-uniform B-Spline method with minimum flight time objective.
- Derive intermediate attitudes according to quaternions at given points using spherical interpolation methods.
- Formulate dynamic models of quadrotor and fully actuated hexarotor and design controllers for specified tasks.
- Simulate whole system in Matlab and AirSim to achieve desired motion, i.e. flipping and crossing narrow frames.

**Design and Simulation of a six-axis Industrial Arm | Project Leader** Shanghai, China

Advisor: Professor **Zhenhua Xiong**, Robotics Institute, SJTU May. 2018 – Jun. 2018

- Simulate typical motion on an industrial arm based on ABB-IRB1600 in SOLIDWORKS and Adams.
- Assemble 3D model with servo motors and reducers selected with simulation results and design transmissions.

**Arm Rehabilitation Exoskeleton | Project Leader** Shanghai, China

Advisor: Associate Professor **Peter Shull**, Robotics Institute, SJTU Sep. 2017 – Jan. 2018

- Design a 5-DOF exoskeleton with 3 DOF at shoulder based on the SOLIDWORKS simulation.
- Perform corresponding motion according to trajectory arrays computed through inverse kinematics.

**Bionic Crab-like Robot | Project Leader** Shanghai, China

Advisor: Professor **Peizhong Yang**, Institute of Intelligent Manufacturing, SJTU Mar. 2017 – Jun. 2016

- Design a bionic crab-like robot with numerous four bar linkages being legs driven by only one motor.
- Adopt 3D printing and laser cutting techniques to manufacture a prototype.

## EXTRACURRICULAR ACTIVITIES

**A+ Club (consists of top 1% of 1200 students in School of ME)** **President** Mar. 2017 – May. 2018

- Organize weekly academic assistance aimed at fellow students with GPA lower than 2.0/4.3.
- Invite seniors and instructors to give lectures about different topics to share individual experiences.
- Summarize the contents of core courses, which have been downloaded over 3,000 times.

**Student Association of Science & Technology in ME** **Minister** Jun. 2016 – Nov. 2017

- Organize Freshman Competition of Innovative Mechanical Design and science & technology lectures.
- Cooperate with various high-tech enterprises to raise funds for competitions and activities.

**Mathematical Contest in Modeling** **Leader** Feb. 2017

- Choose optimized parameters of toll plaza based on cellular automata to reduce traffic congestions.

**Graduation Party of School of Mechanical Engineering** **Volunteer** 2016, 2017

- Assign work for group members, prepare for necessities and receive graduates as well as honored guests.

**Shanghai International Marathon** **Volunteer** Oct. 2016

- Provide water and soft drinks for marathoners at forty kilometers, cheer them up and distribute materials.

## TECHNICAL SKILLS

**Programming Languages** – C/C++, Python, Java

**Applications** – ROS, MATLAB, AUTO CAD, UG, SOLIDWORKS, Origin, LABVIEW, Adams, AirSim