WENBIN XU

✉ wbxu1997@gmail.com | 📞 (+86) 138-1639-4306 | 🌐 wenbinxu.com

EDUCATION

Shanghai Jiao Tong University (SJTU) *Shanghai, China*
- **B.S.** in Mechanical Engineering (**Honor Class**) *Sept. 2015 – June 2019 Expected*
- **GPA** – Overall: **91.26/100**, Major: **91.66/100**, Ranking: **1/59**
- **Standard Tests** – TOEFL: 104 (R28+L24+S23+W29), GRE: 324 (V154+Q170+AW4.0)

PUBLICATIONS

[1] C. Q. Zhou, **W. B. Xu**, C. J. Liu, 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 2018,* 10.1007/s11244-018-1099-7

[2] **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_3 Gas, *22nd International Symposium on Analytical and Applied Pyrolysis, Kyoto, Japan, 2018*. **Conference Abstract**

[3] **W. B. Xu**, X. D. Li, W. D. Xu, L. Gong*, Y. X. Huang, Z. L. Zhao, L. J. Zhao, B. H. Chen, H. Z. Yang, L. Cao, C. L. Liu, Natural Teaching for Humanoid Robot via Human-in-the-loop Scene-motion Cross-modal Perception, *Industrial Robot: An International Journal*. **Accepted**

[4] **W. B. Xu**, X. D. Li, L. Gong*, Y. X. Huang, Z. Y. Zheng, Z. L. Zhao, L. J. Zhao, B. H. Chen, H. Z. Yang, L. Cao, C. L. Liu, Human-robot Interaction Oriented Human-in-the-loop Real-time Motion Imitation on a Humanoid Tri-Co Robot, *3rd International Conference on Advanced Robotics and Mechatronics (ICARM), NUS, Singapore, 2018*. **To Appear**

[5] L. Gong*, X. D. Li, **W. B. Xu**, B. H. Chen, Z. L. Zhao, Y. X. Huang, C. L. Liu, Naturally Teaching a Humanoid Tri-Co Robot in a Real-time Scenario from First Person View, *Science China Information Sciences*. **Accepted**

HONORS & AWARDS

- China National Scholarship (**Top 1%, Three Times,** 8,000 CNY Each Year) *2016, 2017, 2018*
- Tang Lixin Scholarship (**Top 2/422, Twice,** 10,000 CNY Each Year) *2017, 2018*
- Excellent Student Cadre of Shanghai Jiao Tong University (**Top 2%**) *Oct. 2017*
- First Prize of Robomaster 2017 Robotics Competition in Eastern Division (**Top 3/29**) *June 2017*
- Merit Student of Shanghai Jiao Tong University (**Top 10%**) *Oct. 2016*
- Outstanding Student in School of Mechanical Engineering (**Top 10%, Twice**) *2016, 2017*

RESEARCH EXPERIENCES

Synthesis and Catalytic Application of N-doped Carbons for Biomass Hydrolysis *Jan. 2018 – Present*
Advisor: Dr. Hao Ma and Prof. Fei Qi, SJTU Combustion and Energy Research Group
- Synthesized hydrothermally treated carbons (HTC) from aqueous glucose solution under various conditions.
- Introduced metal ions to HTC by dry impregnation to shift XPS peak from pyridinic-N to pyrrolic-N.
- Treated HTC with NH_3 at lower temperature than extant methods to prepare 8 wt% N-doped carbons (NCs).
- Characterized NCs with TGA, BET, TEM and catalyzed the hydrolysis of biomass to produce glucose.
- Adopted as-synthesized NCs as catalyst support for complete conversion of 5,000 ppm methane at 350 ℃.
- Decreased sizes of HTC to the nano scale through addition of buffer solution and organic compounds.
- Increased carbon mesoporosity by doping copper salts to generate oxygen radicals in methane oxidation.

Humanoid Robot 3D Prototyping and Ultra-numerous DOF Control *May 2016 – June 2018*
Advisor: Assoc. Prof. Liang Gong, Institute of Mechatronics
- Assembled a life-size humanoid robot with 29 DOFs through 3D printing and modifications on STL files.
- Performed inverse kinematics for given gestures and sent trajectory arrays to controller through protocols.
- Created URDF files to visualize computed motions on a humanoid model in RVIZ through ROS.
- Developed a real-time mapping algorithm to convert euler angles of human motions into robot joint angles.
- Projected live video from a camera onto VR glasses and captured eye-body-synergic human motion through a set of wearable IMUs to realize real-time imitation of upper limber's motion on a humanoid robot.

SELECTED PROJECTS

Path Planning & Control of Rotorcraft | Leader (95/100, Class 1st/24, Total 2nd/89)   *Mar. – June 2018*
Advisor: Assoc. Prof. Ye Ding, Robotics Institute   ***Course***: *Application of MATLAB in Engineering*
- Generated optimal spatial trajectories based on non-uniform B-Spline method with min flight time objective.
- Derived intermediate attitudes according to quaternions at given points through spherical interpolation methods.
- Formulated dynamic models of various rotors and designed geometric tracking and attitude tracking controllers.
- Simulated the system in Matlab and AirSim to reach desired motion, i.e. flipping and crossing narrow frames.

Design & Simulation of Industrial Robot | Leader (95/100, Class 1st/27, Total 1st/83)   *May – June 2018*
Advisor: Prof. Zhenhua Xiong, Robotics Institute   ***Course***: *Robotics*
- Performed kinematic and dynamic simulation of six-axis ABB-IRB1600 in Solidworks and Adams.
- Assembled 3D models with motors and reducers selected by simulation results and designed transmissions.

Arm Rehabilitation Exoskeleton | Leader (88/100, Class 4th/26)   *Sept. 2017 – Jan. 2018*
Advisor: Assoc. Prof. Peter Shull, Robotics Institute   ***Course***: *Design and Manufacture II*
- Designed 5-DOF exoskeleton with 3 at shoulder, 1 at elbow and 1 at waist based on six-bar linkage mechanism.
- Performed corresponding motion on exoskeleton by parsing trajectory arrays computed by inverse kinematics.
- Developed a user-friendly graphical interface for motion visualization and sending commands.

Bionic Crab-like Robot | Leader (98/100, Class 1st/27, Total 1st/433)   *Mar. – June 2017*
Advisor: Prof. Peizhong Yang, Manufacturing Institute   ***Course***: *Design and Manufacture I*
- Designed bionic crab-like robot with 12 legs composed of multiple four-bar linkages driven by a tiny motor.
- Adopted 3D printing and laser cutting techniques to manufacture and assemble a prototype.

Honorable Mention, 2017 Mathematical Contest in Modeling (Top 30%) **| Leader**   *Feb. 2017*
- Led a team to optimize parameters of toll plaza with cellular automata algorithm to avoid traffic congestions.
- Responsible for research summary, mathematical modeling and data visualization with Matlab and Python.

Smartphone-based Flight Control System | Leader (Rated A+, Top 18 out of 170)   *Oct. 2015 – May 2016*
Advisor: Dr. Junqi Wu, School of Aeronautics   ***National Undergraduate Innovation Program***
- Assembled a single-rotor platform, a rotatable quadrotor platform and homemade UAVs by laser cutting.
- Developed a self-balancing algorithm of single-rotor based on PID and extended it to quadrotor platform.
- Simulated quadrotor motion in Gazebo and AirSim using modified source code PX4 and an offboard API.
- Enabled Raspberry Pi to communicate with Pixhawk through Mavros to control rotor's attitude and position.
- Realized the automatic following on a quadrotor according to GPS obtained from manipulator's smartphone.

EXTRA-CURRICULAR ACTIVITIES

A+ Club (Consists of Top 1% of 1200 Students in School of ME) | Chairman   *Mar. 2017 – May 2018*
- Organized weekly one-to-one academic assistance aimed at fellow students with GPA lower than 2.0/4.3.
- Invited seniors and instructors to deliver lectures on different topics to share personal experiences.
- Summarized the contents of core courses into review materials with 3,000+ downloads.

Student Association of Science & Technology in ME | Minister   *June 2016 – Nov. 2017*
- Organized Freshman Competition of Innovative Mechanical Design and science & technology lectures.
- Cooperated with various high-tech enterprises, i.e. FANUC, to raise funds for competitions and activities.

Graduation Party of School of Mechanical Engineering | Volunteer   *2016, 2017*
- Assigned work for team members, prepared for necessities and received 400+ graduates and honored guests.

Shanghai International Marathon | Volunteer   *Oct. 2016*
- Provided soft drinks for 38,000 marathoners at 40 kilometers, inspired them and distributed supplies.

SKILLS

Characterization – BET, GPLC/HPLC, SEM, TEM, TGA, TOFMS, XPS
Facility – Centrifuge, Fixed Bed Reactor, Glove Box, Muffle Furnaces, Rotary Evaporator, Vacuum Freeze Dryer
Application – Abaqus, Adams, AirSim, AutoCAD, CasaXPS, Labview, MATLAB, ROS, Solidworks, Origin, UG
Programming Language – C/C++, Python, Java, HTML