

# YIHENG LYU

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 Github ◊  LinkedIn

## EDUCATION

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**University of Stuttgart, Germany**  
M.Sc. in Electrical Engineering

*Starting October 2026*

**Nanjing Tech University, China**  
B.Eng. in Automation  
GPA: 88/100

*June 2026*

*Relevant course: Classic Control Theory, Modern Control Theory, Discrete Control, Robotic Control, Machine Learning, Digital Signal Processing, Embedded Systems*

## RESEARCH INTERESTS

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I am interested in Robotic Manipulation, Adaptive Control, Nonlinear Control Systems, Learning-based Control, Intelligent Autonomous Systems, Distributed Optimization.

## RESEARCH EXPERIENCE

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### **Franka Gazebo Adaptive Control with Model Mismatch and Disturbance**

*May 2025 - Present*

Independent Research Project

-  [github.com/hengsleep/Franka\\_Gazebo\\_RBF\\_adaptive\\_control\\_Prj](https://github.com/hengsleep/Franka_Gazebo_RBF_adaptive_control_Prj)
- Developed a ROS 2 and Gazebo-based simulation framework for adaptive torque control of a 7-DOF Franka FR3 robotic manipulator under model uncertainty and external disturbances.
- Integrated computed torque control with online radial basis function (RBF) neural network compensation to improve trajectory tracking performance under uncertain robot dynamics.
- Implemented robot dynamics modeling using Pinocchio and developed a custom torque controller based on `ros2_control` with real-time execution in C++.
- Validated the proposed framework in Gazebo Sim with physical parameter mismatch and disturbance injection scenarios.

### **Adaptive Control of Robotic Manipulators with RBF and $\sigma$ -Modification**

*Jan 2026 - Jun 2026*

Bachelor Thesis Research

-  [github.com/hengsleep/RBF\\_Sigma\\_Adaptive\\_Robot\\_control\\_Prj](https://github.com/hengsleep/RBF_Sigma_Adaptive_Robot_control_Prj)
- Proposed a nonlinear adaptive control framework for uncertain robotic manipulators using radial basis function (RBF) neural networks for online approximation of unknown dynamics.
- Developed a computed torque controller combined with Lyapunov-based adaptive laws and  $\sigma$ -modification to improve robustness against model uncertainties.
- Established uniformly ultimately bounded (UUB) tracking performance through Lyapunov stability analysis.
- Evaluated the proposed controller through MATLAB/Simulink simulations under unknown dynamics and external disturbances.

### **Distributed Adaptive Resource Allocation for Multi-Agent Systems**

*Jan 2025 - Nov 2025*

Research Project

-  [github.com/hengsleep/DARA\\_Lipschitz\\_continuous\\_Prj](https://github.com/hengsleep/DARA_Lipschitz_continuous_Prj)
- Investigated distributed resource allocation problems for multi-agent systems over directed communication networks with limited information exchange.

- Developed distributed adaptive optimization algorithms to achieve cooperative decision-making among heterogeneous agents with locally available objective functions.
- Analyzed convergence properties of distributed algorithms under heterogeneous Lipschitz continuous cost functions and network topology constraints.
- Evaluated the proposed algorithms through numerical simulations on large-scale networked multi-agent systems.

### INTERNSHIP EXPERIENCE

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Automation Engineering Intern – 3M Solventum</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Shanghai, China |
| <i>Jun 2024 - Sep 2024</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |
| <ul style="list-style-type: none"> <li>· Received training in Rockwell RSLogix 5000 PLC programming, including ladder logic development and industrial automation control workflows.</li> <li>· Participated in a machine vision-based quality inspection project, involving industrial camera data acquisition and image-based defect detection for manufacturing processes.</li> <li>· Gained hands-on exposure to automated manufacturing systems, including KUKA robotic manipulators, pneumatic conveying systems, motion control systems, and process monitoring equipment.</li> <li>· Learned industrial communication and control architectures, including Cisco Converged Plantwide Ethernet (CPwE), Process Control Network (PCN), and SCADA-based monitoring systems.</li> </ul> |                 |

### THESES AND RESEARCH REPORTS

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|------------------------------------------------------------------------------------------------|--|
| 1. <i>Adaptive Control of Multi-joint Robotic Manipulator Systems with RBF Neural Networks</i> |  |
| Bachelor Thesis, 2026.                                                                         |  |
| 2. <i>Distributed Adaptive Resource Allocation under Lipschitz Continuous Cost Functions</i>   |  |
| Research Lab Thesis, 2025.                                                                     |  |

### LANGUAGE SKILLS

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|-----------------------------------|--|
| 1. English: C1 (IELTS 7.0)        |  |
| 2. German: A1 (Basic proficiency) |  |

### ACHIEVEMENTS

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|----------------------------------------------------------------------------------------------|-----------|
| <b>Academic Scholarship</b> , Nanjing Tech University                                        | 2022–2026 |
| Awarded annually for academic excellence, ranking among the top 3%, 5%, and 10% of students. |           |
| <b>MCM (Mathematical Contest in Modeling)</b> , COMAP, USA                                   | 2024      |
| Honorable Mention.                                                                           |           |
| <b>RAICOM Robotics Competition</b> , RAICOM International Organizing Committee               | 2024      |
| Provincial Second Prize.                                                                     |           |
| <b>A-ST Network Technology Competition</b> , Computer Education Research Association         | 2023      |
| Provincial Third Prize.                                                                      |           |

### TECHNICAL SKILLS

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|-------------------------------|---------------------------------------------------|
| <b>Programming Languages</b>  | C/C++, Python, MATLAB, LaTeX                      |
| <b>Robotics Frameworks</b>    | ROS 2, Gazebo Sim, MATLAB/Simulink                |
| <b>Control and Simulation</b> | Adaptive Control, Nonlinear Control, Optimization |
| <b>Machine Learning</b>       | PyTorch, TensorFlow                               |
| <b>Engineering Tools</b>      | Git, Linux, PLC (Siemens & Rockwell)              |