Zhongtao(Tony) Guan

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EDUCATION AND RESEARCH EXPERIENCE

- **ShanghaiTech University** *Sep. 2021 - Present*
Bachelor of Engineering, Electronic Information Engineering Shanghai, China
  ◦ GPA: 3.80/4.00; Ranking 3/56
  ◦ Core courses: Introduction to Control, Signals and Systems, Electromagnetic, Power Electronics
  ◦ Scholarship: Undergrad. National Exchange Scholarship; International Conference Scholarship

- **Massachusetts Institute of Technology** *Feb. 2024 - May.2024*
Special Student Program in EECS Cambridge, Massachusetts, U.S.
  ◦ GPA: 5.00/5.00
  ◦ Core courses: Underactuated Robotics, Nonlinear Control

- **Massachusetts Institute of Technology** *July. 2024 - Present*
Undergraduate Visiting Student in EECS Cambridge, Massachusetts, U.S.
  ◦ Advisor: Kevin Chen

PUBLICATIONS C=CONFERENCE, J=JOURNAL, S=IN SUBMISSION, +=EQUAL CONTRIBUTION

[S.1] Yi-Hsuan Hsiao[+], Songnan Bai[+], **Zhongtao Guan**[+], et al. **Hybrid locomotion at the insect scale combined flying and jumping for enhanced efficiency and efficacy**. Manuscript submitted for publication in *Nature Machine Intelligence*.

[C.1] **Zhongtao Guan**, et al. **Preliminary Result of Cury: A Backdrivable Leg Design using Linear Actuators**. In *IEEE/RSJ International Conference on Intelligent Robots and Systems(IROS)*, 2024.

[C.2] **Zhongtao Guan**, et al. **Accurate Single-Ended Fault Location for Cable-OHL Hybrid Transmission Lines**. In *Power and Energy Society General Meeting (PESGM)*, 2023.

[C.3] Jiayu Yang, Yu Liu, Kang Yue, **Zhongtao Guan**, et al. **Closed-Form Solutions of Mutual Inductance and Load for LCC-S Wireless Power Transfer Systems**. In *3rd IEEE International Conference on Industrial Electronics for Sustainable Energy Systems*, 2023.

[C.4] Mengzhao Duan, Yu Liu, Ze Liu, Xinchen Zou and **Zhongtao Guan**. **A Group of Single-Ended Time-Domain Line Fault Location Methods Using Breaker Operation Information**. In *IEEE Power and Energy Society General Meeting (PESGM)*, 2023.

PROJECTS

  ◦
Implicit Regularization and Dynamic Gain in Nonlinear Control *Sep. 2023- Jan. 2024*
Advisor: Prof. Jiahao Chen
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Sensor Autonomy for Insect-Scale Robots *July. 2024- Present*
Advisor: Prof. Kevin Chen
  * Place Holder
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Hybrid Locomotion at Insect Scale *Jan. 2024- Sep. 2024*
Advisor: Prof. Kevin Chen
  * Presented a sub-gram flapping-wing passive hopper at insect scale using soft actuator.

* Demonstrated capabilities in overcoming obstacles, navigating challenging terrains, and exhibiting high agility.
* Trajectory optimization and online NLMPC are used for complex task such as fast dynamic between slopes.
* Contributed to controller design, experiments and data analysis.
* This work is submitted to a journal: [S.1].

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A Backdrivable Leg Design Using Linear Actuators
Aug. 2023 - Jan. 2024
Advisor: Prof. Jiahao Chen
[O]

* Developed a backdrivable 2-DoF leg prototype for walking and jumping.
* Contributed to the design of electronic components, including a highly integrated AC motor drive.
* Reduced the number of joint encoders through optimized mechanical design and electrical integration.
* Built a simulation environment using the Webots simulator for closed-loop chain dynamics.
* Acted as the project leader; responsible for mechatronics design and simulation.
* This work has been accepted as a conference paper: [C.1].

○

Fault Location of Power Systems
Jun. 2022 - Jan. 2023
Advisor: Prof. Yu Liu

* Proposed methods for fault location on hybrid or purely overhead line power system.
* Utilized fully distributed line model for accurate locating, while modified Eriksson method for analytical method .
* Introduced breaker operation information for fault location of pure overhead-line power system.
* Contributed to idea, methodology, experiments for [C.2]; proof reading and discussion for [C.4].
* These works are accepted as conference papers [C.2], [C.4].

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Design and Control of Inverter
Jan. 2023 - Aug. 2023
Advisor: Prof. Yu Liu

* Proposed analytical solutions of mutual inductance and load resistance for the LCC-S WPT system, without communication from the secondary side.
* Designed and controlled a three-phase inverter for grid-connected photovoltaic systems.
* This work is accepted as a conference paper: [C.3]

AWARDS

• **Outstanding Teaching Assistant**
2023
ShanghaiTech University, school of information and technology

○ Acted as head TA Electric Circuit.

○ Coordinated the workload of TAs, Recorded the class, lectured discussion/review session, graded homework.

• **RoboMaster University Championship**
2022
RoboMaster

○ Won 2nd Prize in Shanghai division, 3rd in national division

○ Acted as group leader; contributed to mechanical design.

• **National Undergraduate Electronic Design Contest**
2023
Shanghai Municipal Education Commission

○ Won 2nd Prize in Shanghai division

○ Acted as group leader; contributed to inverter design and control.

○ Included knowledge of device selection, embedded system, SVPWM and PLL.

SKILLS AND OTHERS

○ **Programming Languages:** Python, C/C++, Julia, Matlab
○ **Toolkit:** Simulink, Altium Designer, KiCAD, Solidworks, LaTeX
○ **Teaching:** Electric Circuit, Introduction to Control Project
○ **Research:**

REFERENCES

• **Research Supervisor:** Kevin Chen, Associate Professor Without Tenure, MIT, Contact: Email

• **Research Supervisor:** Jiahao Chen, Assistant Professor, ShanghaiTech, Contact:Email

• **Research Supervisor:** Yu Liu, Associate Professor, ShanghaiTech, Contact: Email