

# JESSICA EN SHIUAN LEU

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## EDUCATION

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### University of California, Berkeley

Berkeley, CA

Ph.D. in Mechanical Engineering (Robotics, Motion Planning, Controls)

Aug. 2017 - May 2022

- Academic advisor: Prof. Masayoshi Tomizuka
- Dissertation title:  
Designing Integrated Strategies for Modularized Robotic Systems in Uncertain Environments
- Dissertation committee:  
Prof. Masayoshi Tomizuka (Chair), Prof. Francesco Borrelli, and Prof. Claire Tomlin

### National Taiwan University (NTU), Taipei, Taiwan

Sep. 2013 - Jun. 2017

Bachelor of Science, Mechanical Engineering

School Year cumulative ranking in class: 1<sup>st</sup>/205 (GPA : 4.22/4.3)

## WORK EXPERIENCES

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### Research Intern at Mitsubishi Electric Research Laboratories

Cambridge, MA

Host: Yebin Wang

Jan. 2021 - May. 2021, Sep. 2021 - Dec. 2021

### Advanced Robotics Eng. Intern at Amazon Robotics

North Reading, MA

Manager: Yuri Ivanov

May. 2021 - Aug. 2021

## RESEARCH INTERESTS

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Robotics, human robot interactions, control and motion planning, optimization and optimal control, exoskeleton and mechanical design.

## SELECTED RESEARCH PROJECTS

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### University of California, Berkeley

Berkeley, CA

Graduate Student Researcher

Aug. 2017 - May 2022

- **Robot Motion Planning** Aug. 2018 - May 2022  
These works present benchmarks which implement and compare existing planning algorithms on a variety of problems. Based on the benchmarking results, we propose hybrid planning algorithms, RRT\*-CFS and RRT\*-sOpt that combine the merits of sampling-based, optimization-based, and trajectory segmentation methods. A motion planner utilizing the improved A-search guided tree is developed for complex kinematic system such as a tractor-trailer system.
- **Integrated Robotic Systems** Aug. 2019 - May 2022  
Integrated robotic systems are developed for settings such as an electronic assembly line with human-robot interaction and a dynamic parking environment with moving obstacles. The multi-module system performs prediction, decision-making, and planning to complete a task while ensuring safety and efficiency.
- **Mitten Prosthesis for Spinal Cord Injury (SCI) Subjects** Aug. 2018 - Oct. 2019  
A novel orthotic is designed to improve hand functionality for individuals with cervical SCI. This device utilizes a slim dorsal leaf spring and underactuated cable drive to passively open and actively close the hand, while ensuring ease of donning and doffing.

- **Walking Strategy for Biped Robots with Artificial Muscles** Sep. 2015 - Jun. 2017  
This work uses pressure sensors to detect the connect surface profile and improve the compatibility of the biped.
- **Pneumatic tube Capsule Opening Device in Hospitals** Jan. 2017 - Jun. 2017  
A pneumatic capsule opening device is developed and installed in a hospital medical laboratory.

## PUBLICATIONS

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1. **J. Leu**, Y. Wang, and S. D. Cairano, “Improved a-search guided tree for autonomous trailer planning,” in *Proc. 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2022)*, submitted, Oct. 2022
2. **J. Leu**, Y. Chen, Changliu, and M. Tomizuka, “Robust task planning for assembly lines with human-robot collaboration,” in *Proc. International Symposium on Flexible Automation (ISFA 2022)*, submitted, July. 2022
3. **J. Leu**, M. Wang, and M. Tomizuka, “Long-horizon motion planning via sampling and segmented trajectory optimization,” in *Proc. 20th European Control Conference (ECC 2022)*, accepted, July. 2022
4. **J. Leu**, Y. Wang, M. Tomizuka, and S. D. Cairano, “Autonomous vehicle parking in dynamic environments: An integrated system with prediction and motion planning,” in *Proc. 2022 IEEE International Conference on Robotics and Automation (ICRA)*, accepted, May. 2022
5. **J. Leu**, G. Zhang, L. Sun, and M. Tomizuka, “Efficient robot motion planning via sampling and optimization,” in *2021 American Control Conference (ACC)*. IEEE, 2021, pp. 4196–4202
6. **J. Leu**, R. Lim, and M. Tomizuka, “Safe and coordinated hierarchical receding horizon control for mobile manipulators,” in *2020 American Control Conference (ACC)*. IEEE, 2020, pp. 2143–2149
7. **J. Leu** and M. Tomizuka, “Motion planning for industrial mobile robots with closed-loop stability enhanced prediction,” in *Dynamic Systems and Control Conference*, vol. 59162. American Society of Mechanical Engineers, 2019, p. V003T19A009
8. D. Kaneishi, **J. Leu**, J. O’Donnell, C. Affleck, R. P. Matthew, A. McPherson, M. Tomizuka, and H. S. Stuart, “Design and assessment of a single-size semi-soft assistive mitten for people with cervical spinal cord injuries,” in *2019 IEEE-RAS 19th International Conference on Humanoid Robots (Humanoids)*. IEEE, 2019, pp. 614–621
9. D. Kaneishi, R. P. Matthew, **J. Leu**, J. O’Donnell, B. Zhang, M. Tomizuka, and H. Stuart, “Hybrid control interface of a semi-soft assistive glove for people with spinal cord injuries,” in *2019 IEEE 16th International Conference on Rehabilitation Robotics (ICORR)*. IEEE, 2019, pp. 132–138
10. **J. Leu**, S.-T. Liu, Y.-H. Chen, and W.-P. Shih, “Development of a humanoid robot foot with distributive force sensors,” in *2017 3rd International Conference on Control, Automation and Robotics (ICCAR)*. IEEE, 2017, pp. 134–137

## TECHNICAL STRENGTHS

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<b>Software &amp; Tools</b>	Matlab, C++ , Python, Linux, ROS, LabVIEW, SolidWorks, COMSOL
<b>Language skills</b>	Mandarin Chinese (native), English, Japanese