

Shuyang Chen

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EDUCATION

Rensselaer Polytechnic Institute Ph.D. in Mechanical Engineering (Robotics)	08/2017 - present
Johns Hopkins University M.S.E. in Mechanical Engineering (Robotics)	08/2014 - 05/2016
Beijing Institute of Technology B.S. in Mechanical Engineering & Automation	09/2010 - 07/2014

RESEARCH EXPERIENCE

Iterative-Learning Robot Manipulators Hybrid Force/Motion Control

- Identified dynamics model of an industrial robot (ABB) with data collected from a high-fidelity dynamic simulator
- Developed iterative learning control algorithm with the identified robot dynamics model as well as the physical ABB robot for hybrid force/motion control

Neural-Learning Robot Manipulators Trajectory Tracking Control

- Combined deep learning with iterative learning control for rigid-joint (ABB) and flexible-joint (Baxter) robot trajectory tracking control through feedforward dynamics compensation using neural networks
- Combined deep learning with adaptive control for rigid/flexible-joint robot trajectory tracking control with asymptotic tracking error convergence

Robot-Assisted Segmented Structures Assembly

- Developed open source ROS packages for control, motion planning, and simulation of an ABB robot
- Developed a kinematic controller for collision-free ABB robot teleoperation in an unstructured environment

Universal Robot Controller Software Component

- Developed an open source software component for Universal Robot (UR) control
- Integrated a self-calibrated three-axis Optoforce sensor with the UR robot for real-time robot cooperative control

TEACHING EXPERIENCE

Teaching Assistant Robotics I, Rensselaer Polytechnic Institute	09/2018 - 12/2018
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AWARDS

IROS Student and Developing Countries (SDC) Travel Award	2019
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PUBLICATIONS

S. Chen and J. T. Wen. Robotic Deep Rolling with Iterative Learning Motion and Force Control. *IEEE Robotics and Automation Letters (RA-L)*, 2020 (submitted)

S. Chen and J. T. Wen. Adaptive Neural Trajectory Tracking Control for Flexible-Joint Robots with Online Learning. *IEEE International Conference on Robotics and Automation (ICRA)*, 2020 (accepted)

S. Chen and J. T. Wen. Neural-Learning Trajectory Tracking Control of Flexible-Joint Robot Manipulators with Unknown Dynamics. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2019

P. Huang, L. Su, **S. Chen**, K. Cao, Q. Song, P. Kazanzides, I. Iordachita, M. Bell, J. Wong, D. Li, K. Ding. 2D ultrasound imaging based intra-fraction respiratory motion tracking for abdominal radiation therapy using machine learning. *Physics in Medicine and Biology*, 2019

S. Chen and J. T. Wen. Industrial Robot Trajectory Tracking Using Multi-Layer Neural Networks Trained by Iterative Learning Control. *arXiv:1903.00082*, 2019

J. T. Wen, J. Wason, D. Kruse, Y. Peng and **S. Chen**. Collaborative Industrial Robot Control: from Safe Motion to Multi-Robot Manipulation. *Recent Advances in Industrial Robotics*, 2019 (accepted)

S. Chen, Y. Peng, J. Cui, J. Wason, G. Saunders, S. Nath and J. T. Wen. Software Framework for Robot-Assisted Large Structure Assembly. *Proceedings of the 2018 Manufacturing Science and Engineering Conference (MSEC)*, College Station, TX, USA, June 18-22, 2018

S. Chen, J. Wang, and P. Kazanzides. Integration of a Low-Cost Three-Axis Sensor for Robot Force Control. *Second IEEE International Conference on Robotic Computing (IRC)*, 2018

S. Chen, B. Gonenc, M. Li, D. Y. Song, E. C. Burdette, I. Iordachita and P. Kazanzides. Needle Release Mechanism Enabling Multiple Insertions with an Ultrasound-guided Prostate Brachytherapy Robot. in *Proc 39th Annu. Int. Conf. of the IEEE Engineering in Medicine and Biology Society (EMBC)*, Jeju Island, Korea, pp. 4339-4342, Jul. 2017

S. Chen, J. Li, L. Fang, Z. Zhu and S. Kang. Simple Triple-State Polymer Actuators with Controllable Folding Characteristics. *Applied Physics Letters*, 110 (13), 133506, 2017

SKILLS

Programming Languages: C/C++, Python, MATLAB

Software: TensorFlow, Robot Operating System (ROS), Git, Microsoft Visual Studio, OpenRAVE, RobotStudio, L^AT_EX