

LIN Qian

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Education

- Tsinghua University, Beijing *Aug. 2016 – Jun. 2020 (expected)*
- B.E. in Mechanical Engineering
 - Major GPA: 3.72/4.0; Rank: 4/136 (**Top 1** among the female students in the department)
 - Core Courses: Strength of Material (A-), Engineering Material (A-), Theoretical Dynamics, Electronical and Electrical Engineering (A-), Mechanical Graphics (A), Complex Analysis (A), Physics (A), Calculus (A), Linear Algebra (A)
- Tsinghua University, Beijing *Aug. 2017 – Jun. 2020 (expected)*
- Minor in Computer Science
 - Core Courses: Data Structure and Algorithm (A-), C++ Programming (A-), Computer Networks, Computer Organization and Architecture
- Summer internship at RPK Laboratory, Johns Hopkins University *Jul. 2018 – Sept. 2018*

Research Experience

- Collision Detection via Closed-Form Minkowski Sum *Jul. 2018 – Sept. 2018*
Advisor: Prof. Gregory S. Chirikjian, Professor in Johns Hopkins University
- Completed a demo of *Rapidly-exploring Random Tree Algorithm* on Robot Operating System.
 - Adopted a quartic solver to *Algebraic Separation Conditions Algorithm* to improve its speed (which is nearly 20 times faster than the previous test) to compare it with the proposed collision detection algorithm between ellipsoidal and superquadric agents based on closed-form *Minkowski Sum*.
 - Proposed a collision detection algorithm which is efficient in both time and space, which runs about 2 times faster than Gilbert-Johnson-Keerthi algorithm in the cases involving superellipse and superquadric.
- Mechanical LIDAR Based on Trigonometry Distance Measurement *Jan. 2018 – Jun. 2018*
Research Assistant | *Advisor: Prof. Jun Zhu, Associate Professor in Tsinghua University*
- Built a small opto-mechatronics system sending laser beam for ranging, which realize the perception of the obstacles in the surrounding environment, and achieved high precision ranging and reconstruction under low cost.
 - Developed a system including optical system, mechanical system, circuit system and communication system.
 - Introduced dual receivers to reduce the blind zone, applied wireless power supply, wireless communication scheme and motor directly driving scheme. Developed the PC software with python to visualize the range information.
- Dynamic Modeling of the Harmonic Drive System Considering Stick-Slip Friction *Sept. 2017 – May 2018*
Research Assistant | *Advisor: Prof. Shaoze Yan, Professor in Tsinghua University*
- Proposed a new dynamic model of the system, which can reveal the Stick-Slip phenomenon. Considered other nonlinear factors in the Harmonic Drive System comprehensively to improve the system dynamic model.
 - Proposed a precise model that can guide the further precise control to achieve better performance of Harmonic Drive.
- Finite Element Analysis of the Real Contact Area of the Rough Surface *Mar. 2017 – Dec. 2017*
Research Assistant | *Advisor: Prof. Shaoze Yan, Professor in Tsinghua University*
- Conducted finite element analysis on the real contact area and contact characteristic of rough micro-surface models during the uploading contact process.
 - Discovered that the real contact area and normal load nearly represents a linear relationship under regular load, which agrees with the previous experiment. Concluded from the curve of real contact area and load that the self-affine fractal surface model can better describe the real rough surface than the Gaussian surface model in terms of contact characteristic.

Publication

Sipu Ruan, Karen Poblete, Yingke Li, **Qian Lin**, Qianli Ma and Gregory S. Chirikjian. *Efficient Exact Collision Detection between Ellipsoids and Superquadrics via Generalized Closed-form Minkowski Sums*. (Accepted by ICRA 2019)

Honors and Awards

- Member of Spark Project (**60/3000**, Tsinghua, dedicated to scientific and technological innovations) *Dec. 2018*
- Nanxiang Jiang Scholarship (**top 1%** junior students, award for comprehensive excellence) *Oct. 2018*
- Honorable Mention of the Interdisciplinary Contest in Modeling *May 2018*
- Friends of Tsinghua – PetroChina Scholarship (**1/140**, award for comprehensive excellence and sports excellence) *Oct. 2017*

Skills

- **Program language:** C++, Java and MATLAB.
- Skilled at Linux and ROS. Experienced in server maintaining.
- **Language:** Mandarin, English.