

# Leisheng Zhong

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## Education

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**Tsinghua University, Beijing, China**

*Ph.D.*

Institute of Information Cognition & Intelligent System, Department of Electronic Engineering

**GPA: 90.0/100**

2015 – 2020

**Tsinghua University, Beijing, China**

*B.Eng.*

Department of Electronic Engineering

**GPA: 90.5/100**

2009 – 2013

## Research Interests and Skills

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**Research Interests:** 3D Computer Vision, Multiview Geometry, Robotic Vision, Computer Graphics, Machine Learning.

**Research Experiences:** Pose Estimation, AR/VR, Rendering, Visual/Lidar/RGB-D SLAM, 3D Reconstruction, CNN, GAN.

**Languages and Tools:** C++ (with CUDA), Python, Matlab, OpenCV, OpenGL, PCL, Tensorflow, Pytorch.

## Publications

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- **Leisheng Zhong**, Xiaolin Zhao, Yu Zhang, Shunli Zhang, Li Zhang. Occlusion-aware Region-based 3D Pose Tracking of Objects with Temporally Consistent Polar-based Local Partitioning. *IEEE Transactions on Image Processing (TIP)*, vol.29, pp.5065-5078, 2020.
- **Leisheng Zhong**, Yu Zhang, Hao Zhao, An Chang, Wenhao Xiang, Shunli Zhang, Li Zhang. Seeing Through the Occluders: Robust Monocular 6-DOF Object Pose Tracking via Model-guided Video Object Segmentation. *IEEE Robotics and Automation Letters (RA-L) & IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2020.
- **Leisheng Zhong**, Li Zhang. A Robust Monocular 3D Object Tracking Method Combining Statistical and Photometric Constraints. *International Journal of Computer Vision (IJCV)*, vol.127, no.8, pp.973-992, 2019.
- **Leisheng Zhong**, Ming Lu, Li Zhang. A Direct 3D Object Tracking Method Based on Dynamic Textured Model Rendering and Extended Dense Feature Fields. *IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)*, vol.28, no.9, pp.2302-2315, 2018.

## Work Experience

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- **Internship at Tencent Autonomous Driving Center, Summer 2019.**
  - Help to develop a dynamic object removal method in point cloud data based on probabilistic mapping.
  - Work on large scale voxel mapping, submap generation, robust submap matching for loop detection and pose refinement.
  - Learn a lot about different aspects of the whole autonomous driving pipeline (Perception, Localization, HAD map, etc).
- **Researcher at Topmoo Tech, 2013-2015.**
  - Develop an AR-assisted equipment repair demo using markerless monocular 3D pose estimation.
  - Develop a highly accurate 3D pose tracker based on infrared markers (with both monocular and binocular settings).
  - Build a vision-aided robot arm prototype (applications: automatic pick-and-place, planar target tracking, etc).

## Projects with Demo

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**Demo videos of these and more projects could be found in my homepage:** 🌐 <https://zx007zls.github.io>

### 3D Object Tracking for Augmented Reality

- Real-time Augmented Reality (AR) demo based on our research about 3D object tracking.
- C++ implementation with CUDA acceleration, realizing fast and accurate 3D tracking, together with realistic AR renderings.
- Robust to surface texture, background cluttering, illumination changes, partial occlusion and fast motions.

### A Stereo-Lidar SLAM System

- Build a Simultaneously Localization and Mapping (SLAM) system based on a line-scan Lidar and a stereo camera pair.
- Independently build both hardware (sensors, servo, controller, etc.) and software (loosely coupled visual-lidar SLAM).
- Realize 3D reconstruction of both indoor and outdoor environment with high precision.

## Honors and Awards

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Outstanding Graduates of Beijing, 2013 & 2020

First-Class Academic Scholarship in Tsinghua University, 2018

National Scholarship for Doctoral Students, 2017

National Scholarship for Undergraduate Students, 2012

Tsinghua-Samsung Scholarship, 2011