

# Tixiao Shan

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## Research Interests

My research focuses on developing autonomous navigation system for unmanned ground vehicles with constrained computational resources. I have special interests in SLAM and machine learning. I have developed localization, mapping and motion planning algorithms that run in real-time on ground vehicles.

## Education

- 2014–Present **Stevens Institute of Technology**, *New Jersey, US*, PhD, Mechanical Engineering.  
GPA 4.0/4.0, Top 1%
- 2011–2014 **Shanghai University**, *Shanghai, China*, MS, Mechanical Electronics Engineering.  
GPA 3.59/4.0, Top 5%
- 2007-2011 **Qingdao University**, *Qingdao, China*, BS, Mechanical Engineering and Automation.  
GPA 3.56/4.0, Top 5%

## Research Experience

- 2014 - **Research Assistant**, *Stevens Institute of Technology*.  
Present Design Autonomous navigation system (localization, mapping and motion planning) for unmanned ground vehicles. Utilize deep learning technique to enable lidar super-resolution and planning under uncertainty.
- 2013 - 2014 **Assistant Engineer**, *Shanghai ABB Engineering CO. Ltd.*.  
3D modeling of assembly tools for BMW clutch. Design roll table for BMW engine production line.
- 2012 - 2014 **Research Assistant**, *Shanghai University*.  
Design embedded control system circuit board for UAV, a project sponsored by National Natural Science Foundation of China (No.61175092).

## Teaching Experience

- 2017-Present **ME598**, *Intro to Robotics*, Lab Instructor, Stevens Institute of Technology.
- 2017-Present **ME483**, *Control Systems*, Teaching Assistant, Stevens Institute of Technology.
- 2018 **ME322**, *Engineering Design*, Instructor, Stevens Institute of Technology.
- 2016 **ME470**, *Systems Laboratory*, Instructor, Stevens Institute of Technology.

## Skills

- Programming C/C++, Python
- Software ROS, PCL, OpenCV, Tensorflow, PyTorch, Keras, Numpy, Matplotlib, Matlab, AutoCAD,
- Infrastructure Solidworks, Gazebo, Linux, Final Cut Pro
- Industry SLAM, Autonomous Navigation, Deep Learning, 3D Modeling

## Publications

- 2019 K. Doherty, T. Shan, J. Wang, and B. Englot, "Learning-aided 3D Occupancy Mapping with Bayesian Generalized Kernel Inference," *IEEE Transactions on Robotics*, Accepted, To Appear.

- 2019 J. Wang, T. Shan, and B. Englot, "Underwater Terrain Reconstruction from Forward-Looking Sonar Imagery," *IEEE International Conference on Robotics and Automation*, Accepted, To Appear in May 2019.
- 2019 F. Chen, S. Bai, T. Shan and B. Englot. "Self-Learning Exploration and Mapping for Mobile Robots via Deep Reinforcement Learning." *International AIAA Information-Driven Decision and Control Conference*, 2019
- 2018 T. Shan, K. Doherty, J. Wang and B. Englot. "Bayesian Generalized Kernel Inference for Terrain Traversability Mapping." *Conference on Robot Learning*, 2018.
- 2018 T. Shan, and B. Englot. "LeGO-LOAM: Lightweight and Ground-Optimized Lidar Odometry and Mapping on Variable Terrain." *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pp. 4758-4765, 2018.
- 2017 T. Shan, and B. Englot. "Belief roadmap search: Advances in optimal and efficient planning under uncertainty." *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pp. 5318-5325, 2017.
- 2016 B. Englot, T. Shan, S.D. Bopardikar, and A. Speranzon. "Sampling-based min-max uncertainty path planning." *IEEE International Conference on Decision and Control*, pp. 6863-6870, 2016.
- 2015 T. Shan, and B. Englot. "Sampling-based Minimum Risk path planning in multiobjective configuration spaces." *IEEE International Conference on Decision and Control*, pp. 814-821, 2015.
- 2015 T. Shan and B. Englot, "Tunable-Risk Sampling-Based Path Planning Using a Cost Hierarchy," *IEEE International Conference on Robotics and Automation Workshop*, pp. 2, 2015.

## --- Awards

- 2014-2017 Stevens Innovation and Entrepreneurship Fellowship
- 2013 National Scholarship for Graduate Students
- 2013 Outstanding Students of Shanghai University
- 2007-2010 Qingdao University Scholarship (6 times)
- 2008-2010 Outstanding Students of Qingdao University (3 times)
- 2009 Tsingtao Brewery Education Scholarship