

# Tianshu Kuai

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🌐 <https://tianshukuai.github.io>

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📍 Toronto, Canada

## Education

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- Sep 2022 – Mar 2024 | **Master of Science in Applied Computing, University of Toronto**  
**AI Concentration**  
cGPA: 4.00 / 4.00
- Sep 2017 – Apr 2022 | **Bachelor of Applied Science in Engineering Science, University of Toronto**  
**Robotics Major**, Artificial Intelligence Minor  
Major GPA: 3.80 / 4.00, cGPA: 3.73 / 4.00  
*University of Toronto Excellence Award, NSERC Undergraduate Student Research Awards, Dean's Honour List*

## Experience

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- May 2023 - Ongoing | **Samsung AI Center Toronto** | Research Intern  
*Supervised by Dr. Alex Levinshtein, Samsung AI Center Toronto*
  - Research on diffusion model based real-world image restoration and enhancement
- May 2022 - Ongoing | **University of Toronto** | 3D Computer Vision Researcher  
*Supervised by Prof. Igor Gilitschenski, Toronto Intelligent Systems Lab (TISL)*
  - Currently working on 3D scene representation and manipulation
  - Proposed a template-free method [3] for building animatable 3D models for arbitrary types of articulated and deformable objects from a collection of monocular videos, which allows users to animate reconstructed objects in 3D for content creation
- May 2021 - Apr 2023 | **University of Toronto** | Computer Vision Researcher  
*Supervised by Prof. Steven L. Waslander, Toronto Robotics and Artificial Intelligence Lab (TRAILab)*
  - Currently working on self-supervised LiDAR semantic segmentation for autonomous driving, and contributed to the development of a novel method [2] that outperforms state-of-the-art 2D-to-3D representation learning frameworks
  - Designed and supported the development of high-performance LiDAR 3D object detection models for autonomous vehicles. PDV [1] achieved state-of-the-art multi-class 3D object detection results on Waymo Open Dataset upon publication
  - Undergraduate thesis on improving feature learning processes to get more robust features and more accurate bounding box refinement for 3D object detectors
- July 2021 - June 2022 | **aUToronto** | Computer Vision Engineer  
*University of Toronto Autonomous Driving Group, SAE/GM AutoDrive Challenge*
  - Research on fast and lightweight 3D perception models on collected data
  - Worked on deploying real-time perception models on autonomous vehicles
- May 2020 - May 2021 | **Qualcomm** | Machine Learning Research Intern  
*Supervised by Dr. Shaojie Zhuo, Machine Learning Research Team*
  - Proposed several efficient deep learning models for audio processing
  - Applied state-of-the-art methods for neural network compression
  - Contributed to NPU software compiler pipeline development

## Publications

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- 2023 | [3] **T. Kuai**, A. Karthikeyan, Y. Kant, A. Mirzaei, and I. Gilitschenski, "CAMM: Building Category-Agnostic and Animatable 3D Models from Monocular Videos," *CVPRW* 2023.
- 2023 | [2] A. Mahmoud, J. S. K. Hu, **T. Kuai**, A. Harakeh, L. Paull, and S. L. Waslander, "Self-Supervised Image-to-Point Distillation via Semantically Tolerant Contrastive Loss," *CVPR* 2023.
- 2022 | [1] J. S. K. Hu, **T. Kuai**, and S. L. Waslander, "Point Density-Aware Voxels for LiDAR 3D Object Detection," *CVPR* 2022.

## Academic Service

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Reviewer | CVPR 2023, WACV 2024

## Honors

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- Jan 2020 | **University of Toronto Engineering Competition**
- Awarded the second prize in the senior design competition
- Mar 2019 | **NSERC Undergraduate Student Research Award**
- Undergraduate student research award from Natural Sciences and Engineering Research Council of Canada (NSERC)
- Feb 2019 | **University of Toronto Excellence Award**
- Awarded to University of Toronto undergraduate students based on research aptitude
- Sep 2017 | **University of Toronto Engineering Entrance Scholarship**
- Scholarship for top engineering candidates pursuing studies at the University of Toronto

## Selected Projects

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- 2021 | **Real Time Audio Denoiser**
- A model built using convolutional neural networks with an encoder-decoder structure
  - The model takes the noisy speech as input and produces a de-noised speech as the output
  - Achieved good performance on various types of signals with only around 33k parameters
- 2020 | **Deep Learning Based COVID-19 Diagnosis Tool**
- A finetuned ResNet-18 for COVID-19 diagnosis using Lung CT scan
  - Finetuned U-Net for labelling the infection area on raw CT scans for COVID-19 patients
  - Great potential to be a commercial software product for hospitals where COVID-19 testing kits are unavailable
- 2019 | **Autonomous Ball Dispensing Mobile Machine**
- Started from literature and market survey, through professional engineering decision-making tools to successfully converge to a fully autonomous ball dispensing machine prototype
  - Used PIC18F4620 with MPLAB X and Arduino Nano to enable movement of its components, real-time clock, user Interface, and IR Remote Control
  - Can potentially be used for automatic delivery and dispensing in warehouses