# Tianyi Xiong

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## Education

- **Tsinghua University** — Beijing, China
  *Computer Science and Technology, Bachelor Degree* — *Aug 2019 - Present*
  - GPA: 3.85 / 4.00 (top 25%); Minoring in Statistics
  - GPA 4.00 in Core Courses: Calculus, Linear Algebra, Discrete Math, Probability and Statistics, Fundamental of Programming, Principles of Signal Processing, OOP, JAVA, Computer Graphics, HCI, Machine Learning, 3D Visual Computing...
  - Research Interests: Machine Learning & Computer Vision

## Research Experience

- **Open-Vocabulary Panoptic Segmentation** — Jul 2022 - Present
  *Advisor: Prof. Zhuowen Tu* — *mlPC Lab, UC San Diego*
  - Proposing a two-stage framework for open-vocabulary panoptic segmentation based on pretrained CLIP
  - Using prompt tuning and multi-scale training techniques to solve the problem of domain shift created by object masks and distribution difference of unseen datasets
  - Aiming at outperforming previous works by a clear margin and offering new ideas for perception of the open world
- **Automatic Commercial Place Planning System** — Apr 2022 - Jun 2022
  *Advisor: Prof. Songhai Zhang* — *Graphics & Geometric Computing Group, Tsinghua University*
  - Proposed an automatic system for generating traffic flows of commercial places in virtual environments based on parameterization of traffic flow patterns
  - Designed a set of traffic flow patterns and constraints, implemented an iterative optimization algorithm based on simulated annealing, and undertook two user studies to prove its effectiveness
  - Submitted to **IEEE VR 2023**
- **Automatic Video Clipping System** — Nov 2021 - Jul 2022
  *Advisor: Prof. Songhai Zhang* — *Graphics & Geometric Computing Group, Tsinghua University*
  - Proposed a 3-step pipeline which help users to generate well-edited videos with rhythmical background music
  - Deployed CLIP model on mobile devices, designed an effective mapping algorithm to filter multiple object classes for theme recognition, and implemented various shot scoring algorithms for further refinement
  - Simplified user input into text descriptions and choice making, served as pre-survey for an in-progressing new product
- **Semi-supervised Image Cropping** — Apr 2021 - Aug 2021
  - Proposed a semi-supervised pipeline based on contrastive learning for recommendation on image cropping
  - Used Poolnet for saliency & structural feature detection and WGAN for coordinate generation

## Projects Experience

- **3D Aware Object Segmentation** — May 2022 - June 2022
  - Course Project for 3D Visual Computing, a 3D-aware pipeline for object segmentation of rgbd images
  - Implemented a three-step pipeline of background filtering, frustum reconstruction, and point cloud segmentation, outperformed the original 2d U-Net baseline by a clear margin
- **Smart GYM** — Oct 2021 - Dec 2021
  - HCI class project, an Oculus app developed with Unity
  - Designed various interactive patterns for user to control the sports equipments and exercise under smart guidance
- **Ray Tracer** — Mar 2021 - Jun 2021
  - Course project of Fundamental of Computer Graphics, a C++ image renderer based on path-tracing algorithm
  - Implemented multiple extend functions including depth of view, bump texture mapping, motion blur, volume light and bezier surface rendering
- **Dexterous Robotic Hands Playing Ceramic Flute** — Jul 2020 - Sep 2020
  - Used dexterous robotic hands to play ceramic flutes by controlling gestures and blowing rate
  - Won the Outstanding Work Award in the 2020 National Conference on Sound and Music Technology

## Honors and Awards

- Excellent Comprehensive Scholarship of Tsinghua University (top 10 %), Dec 2021
- Excellent Athletic Scholarship of Tsinghua University, Nov 2021
- Five-star Volunteer of Tsinghua University, Jun 2021
- 2020 Rational Physics College Competition, First Award (top 10 %), Dec 2020
- 2019-2020 Outstanding Student of Tsinghua University (top 10 %), Oct 2020
- National Scholarship (top 2 %), Sep 2020
- 35th Chinese Physics Olympiad (Final), Second Award (top 0.1 %), Oct 2018

## Leadership Experiences And Extracurricular Work

- **Monitor of Class 95, Department of Computer Science and Technology**: Held various class activities, won the 2021 Excellence Class of Tsinghua University (top 5%) & 2021 Academic Excellence Class of Tsinghua University.(July 2021 - July 2022)
- **Trainee, Tsinghua 13th XinHuo Program**: XinHuo Program aims at training students to be the backbone of volunteering. As a member of it, I have participated in over 300 hours of volunteer work, and worked as doping chaperone in the Beijing 2022 Winter Olympics. (Aug 2020 - May 2022)
- **Leader, Running Team of Computer Science Department**: Held weekly training and various snacks parties, won two consecutive champions (1/33) in Tsinghua 10x1000m relay race. (Aug 2021 - Present)

## Skills

- **Programming Languages**: C/C++, Python, Java, R, HTML/CSS, JS, Assembly, C#
- **Tools and Frameworks**: Git, Latex, Pytorch, Vue, Diango, Qt, Linux, Bash, Jittor
- **Sports**: soccer & track and field school team, Champion of the 2020 Beijing University Soccer League