

# YIZHI (DAVID) SONG

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## Education

CGV Lab, Department of Computer Science, Purdue University

Sep. 2019 – Present

*Ph.D. in Computer Science*

*West Lafayette, IN*

College of Computer Science, Zhejiang University

Sep. 2015 – Jul. 2019

*B.E. in Computer Science & Technology*

*Hangzhou, China*

## Publications and Patents

- He, L., **Song, Y.**, ... & Zhou, X. (2024). Kubrick: Multimodal Agent Collaborations for Video Generation ([Project page](#)).
- Tarrés, G. C., Lin, Z., Zhang, Z., Zhang, J., **Song, Y.**, ... & Kim, S. Y. (2024). Thinking Outside the BBox: Unconstrained Generative Object Compositing. **ECCV 2024**.
- **Song, Y.**, Zhang, Z., ... & Aliaga, D. (2024). IMPRINT: Generative Object Compositing by Learning Identity-Preserving Representation. **CVPR 2024** ([Article](#)).
- **Song, Y.**, Zhang, Z., Lin, Z., Cohen, S., Price, B., ... & Aliaga, D. (2023). ObjectStitch: Object Compositing With Diffusion Model. **CVPR 2023** ([Article](#)).
- **Song, Y.**, Fan, R., Huang, S., Zhu, Z., & Tong, R. (2019). A Three-stage Real-time Detector for Traffic Signs in Large Panoramas. *Computational Visual Media*, 5, 403-416 (**oral**) ([Article](#)).
- **Song, Y.**, Zhang, Z., ... & Kim, S. Y. Systems and Methods for Image Compositing. US Patent: under review.

## Working Experiences

ObjectStitchv2 with Identity-Preserving Representation

Adobe Research, May 2023 – Aug. 2023

*Research Scientist Intern*

*San Jose, CA*

- Trained an encoder (**DINOv2** based) for **identity-preserving representation**, greatly improved detail preservation.
- Improved self-supervised training by using large scale multi-view datasets and introducing harmonization augmentation.
- Introduced shape-guided generation, allowing edits such as **novel view synthesis** and **non-rigid transformations**.

Mask-free Composite Image Generation

Adobe Research, May 2023 – Aug. 2023

*Research Scientist Intern (collaborator)*

*San Jose, CA*

- **Removed the mask** from *ObjectStitch*, allowing the model to insert objects at any natural location at a natural scale.
- The generation was no longer limited by the input mask, making the synthesis of **long shadow & reflection** possible.
- The **new data generation pipeline** obtained clean background without objects, by shadow-detection & inpainting.

ObjectStitch: Generative Object Compositing

Adobe Research, Jun. 2022 – Sep. 2022

*Research Scientist Intern*

*Remote*

- Developed the **first diffusion model-based** unified framework for generative object compositing that handles view synthesis, geometry correction, harmonization and shadow generation at the same time while preserving appearance.
- Designed a content adaptor based on **transformer** and **CLIP** that produces multi-modal embedding from the inputs.
- Proposed a fully **self-supervised** training scheme without any manual annotations and data augmentation techniques.

Depth-Based Image Inpainting

Qualcomm, Inc., Jun. 2021 – Aug. 2021

*Interim Engineering Intern*

*Remote*

- Developed a scene **depth-aware inpainting** model, and integrated it in an interactive **image editing application**.
- The application supported zooming and moving of various foreground objects while filling the revealed **irregular holes**.
- Designed a new training scheme, generated a **synthetic RGBD dataset** to train the network with **partial conv.**
- The trained model **outperformed** the traditional inpainting models on RGB-D images captured by mobile phone.

## Research Experiences

Real-time Traffic Sign Detection

Tsinghua University, Aug. 2018 – Sep. 2018

*Instructor: Prof. Shimin Hu*

*Beijing, China*

- Proposed a novel traffic sign detection framework (based on **Faster RCNN**) for autonomous driving which achieved both the fastest speed (more than **100fps**) and state-of-the-art detection accuracy (**0.92**) on TT100k benchmark.

3D Building Wireframe Reconstruction from a Single Image Purdue University, Aug. 2020 – May 2022

*Instructor: Prof. Daniel Aliaga, Prof. Bedrich Benes*

*West Lafayette, IN*

- Designed an interactive **render engine** using **OpenGL** and **ImGui** which can render street-view layouts of buildings.
- Implemented an interactive application based on **Qt** to do camera calibration on Google Street View (**GSV**) images.
- Trained a model to extract corners and edges from building in street-view imagery and reconstruct 3D wireframes.

## Technical Skills

Pytorch, Diffusers, OpenCV, OpenGL, Git, Qt, Linux, Python, C, C++.