

# SHEN ZHENG

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## EDUCATION

### Carnegie Mellon University

Aug. 2022 — Dec. 2023

Master of Science in Computer Vision (MSCV) | GPA: 4.16/4.33

Pittsburgh, PA

- Lab: [Illumination and Imaging Lab](#)
- Advisor: [Dr. Srinivasa Narasimhan](#)
- Coursework (A+): Learning-based Image Synthesis, Visual Learning and Recognition, Computer Vision, MSCV Capstone.

### Wenzhou-Kean University

Sep. 2017 – Jun. 2021

Bachelor of Arts in Mathematical Sciences | Major GPA: 3.94/4.00 (Rank: 1/29)

Wenzhou, China

- Advisor: [Dr. Gaurav Gupta](#)
- Honors: Dean's List (Top 3%); Zhejiang Provincial Government Scholarship (Top 3%); Outstanding Graduate (Top 10%).

## SELECTED PUBLICATIONS

- **Shen Zheng**, et al. (2023), "Addressing Source Scale Bias via Instance-Level Image Warping for Domain Adaptation". **Under Review**.
- **Shen Zheng**, et al. (2023), "TPSeNCE: Towards Artifact-Free Realistic Rain Generation for Deraining and Object Detection in Rain". **WACV**.
- **Shen Zheng**, et al. (2023), "Low-light Image and Video Enhancement: A Comprehensive Survey and Beyond". **TNNLS** (IF=14.26).
- **Shen Zheng**, et al. (2022), "PointNorm: Dual Normalization is All You Need for Point Cloud Analysis". **IJCNN** (Oral).
- Changjie Lu, **Shen Zheng**, et al. (2022), "AS-IntroVAE: Adversarial Similarity Distance Makes Robust IntroVAE". **ACML**.
- **Shen Zheng** and Gaurav Gupta (2022), "Semantic-Guided Zero-Shot Learning for Low-Light Image/Video Enhancement". **WACV**.
- **Shen Zheng**, et al. (2021), "Deblur-YOLO: Real-Time Object Detection with Efficient Blind Motion Deblurring", **IJCNN** (Oral).

## RESEARCH EXPERIENCES

### Addressing Source Scale Bias via Instance-Level Image Warping for Domain Adaptation

May. 2022 – Nov. 2023

- Propose a instance-level image warping technique using dataset-specific size statistics to warp images in-place during training to address scale bias.
- Integrate image warping and feature unwarping into unsupervised domain adaptation in a task-agnostic way without test-time warping.
- Obtained +3.4 % mAP50 for BDD100K day → night object detection, and +4.1% mIoU for Cityscapes → ACDC semantic segmentation.

### TPSeNCE: Towards Artifact-Free Realistic Rain Generation for Deraining and Object Detection in Rain [\[Github\]](#) [\[Video\]](#) Dec. 2022 – Mar. 2023

- Introduce a Triangular Probability Similarity (TPS) loss based on GAN discriminator to minimize the artifacts and distortions for rain generation.
- Propose a Semantic Noise Contrastive Estimation (SeNCE) strategy based on patch similarity and semantic similarity to optimize the rain amount.
- Obtained the best performances in rain generation (KID=72.19), rain removal (MUSIQ=61.853), and object detection ( $mAP_{50}$ =0.526) at BDD100K.

### PointNorm: Dual Normalization is All You Need for Point Cloud Analysis [\[Github\]](#) [\[Slides\]](#)

Jun. 2022 – Aug. 2022

- Introduced PointNorm, a point cloud analysis network leveraging local mean and global standard deviation to boost loss and gradient stability.
- Proposed a plug-and-play DualNorm that normalize sampled and grouped points to each other to optimize the point cloud density.
- Achieved superior results on shape classification at ScanObjectNN (OA = 86.8%), part segmentation at ShapeNetPart (Inst. mIoU = 86.2%).

### AS-IntroVAE: Adversarial Similarity Distance Makes Robust IntroVAE [\[Github\]](#) [\[Slides\]](#)

Mar. 2022 – May. 2022

- Introduced Adversarial Similarity Distance IntroVAE (AS-IntroVAE) to address posterior collapse and vanishing gradient in image generation.
- Proposed Adversarial Similarity Distance (AS-Distance) using 2-Wasserstein distance, kernel trick, and batch-wise prior matching.
- Delivered superb results on image generation (FID=129.61) and reconstruction (PSNR=23.156) at CelebA with fast convergence (<20 epochs).

### Semantic-Guided Zero-Shot Learning for Low-Light Image/Video Enhancement [\[Github\]](#) [\[Slides\]](#) [\[Video\]](#)

Apr. 2021 – Jun. 2021

- Proposed a semantic-guided, zero-shot, low-light image enhancement network that consolidates high-level semantics into low-level enhancement.
- Constructed a recurrent image enhancement network that only demands an enhancement factor map with five non-reference loss functions.
- Attained the state-of-the-art UNIQUE/BRISQUE (0.805/27.01), mIOU/mPA (65.87%/74.50%) and inference time (<0.001s)

## PROFESSIONAL EXPERIENCES

### General Motors

Dec. 2022 – Now

- Collaborated with [Eran Kishon](#) from General Motors Israel on developing scene understanding algorithms that work in various bad weather.

### Momenta

Sep. 2021 – Feb. 2022

- Worked as a perception engineer intern with Yongjun Yu and [Dr. Wangjiang Zhu](#) on data augmentation, auto-labeling and traffic light detection.
- Implemented CycleGAN for unsupervised data augmentation, transforming traffic lights from left arrow to round and left U-turn arrow.
- Constructed a traffic light auto-label model using quantized VoVNet-57, filtering 14,618 incorrect annotations from 1.16M frames.
- Boosted leftUturn traffic light classification accuracy from 78.41% to 87.27% and elevated mAP50 from 93.01% to 94.80%.

## ACADEMIC ACTIVITIES

- **Technical Program Committee:** WCCI 2024
- **Reviewer:** CVIP 2021, CVIP 2022, AAAI 2022, WACV 2023, WACV 2024, IJCNN 2023, TNNLS, IJCV.
- **Co-instructor,** MATH 3291/3292: "Computer Vision", Wenzhou-Kean University, Summer 2023. [\[Recordings\]](#) [\[Slides\]](#)
- **Guest Speaker:** "Image Processing with Machine Learning", Fudan University, Spring 2021. [\[Slides\]](#)
- **LeetCode Content Creator:** Created 90+ LeetCode tutorial videos on YouTube, garnering over 10,000 views. [\[Link\]](#)

## SKILLS

- **Languages:** Python, C++, Java, R, C, Matlab, Shell, SQL, HTML, LaTeX, Markdown
- **Frameworks & Tools:** PyTorch, TensorFlow, Keras, MNCV, Docker, Git, ONNX, CUDA, Jupyter, AWS, Ubuntu
- **Libraries:** Scikit-Learn, NumPy, OpenCV, SciPy, Pandas, Matplotlib, Seaborn
- **DL Models:** CNN, RNN, Transformer, GAN, VAE, MLP, Diffusion