

# Mengwei Ren

✉ [mengwei.ren@nyu.edu](mailto:mengwei.ren@nyu.edu)  
🌐 <https://mengweiren.com>

## Research Interests

**Computer Vision, Generative Models, Representation Learning**

## Education

- 2018 - 2023 **Ph.D.**, *Computer Science*, New York University
- Thesis: Improving Image-to-Image Models via Enhanced Intermediate Representation.
  - Thesis Committee: Guido Gerig (advisor), Polina Golland, Kilian Pohl, Mert Sabuncu.
- 2014 - 2018 **B.S.**, *Computer Science*, East China Normal University
- Thesis: 3D Deep Dense Descriptor for Volumetric Shapes with Adversarial Networks.

## Experience

- 01/2025 **Member of Technical Staff**, *PhotaLabs*  
-Current
- Building personalized visual GenAI models and end-to-end pipelines for generating and editing images of real people and real moments.
- 02/2024 **Research Scientist**, *Photoshop*, Adobe Inc.  
-01/2025
- Leading the Generative Harmonization initiative, driving research innovation and cross-functional execution from concept to large-scale product impact.
    - **Research Impact:** Developed a unified generative modeling framework for realistic harmonization of color, lighting, and visual effects in image composition. Led a large-scale collection of high-quality, diverse pixel-aligned image pairs. Selected as one of 9 projects (out of 135) for Adobe MAX Sneaks 2024, Adobe's premier stage for innovative research; covered by CNET.
    - **Product Impact:** Transitioned research prototype into a production-ready feature, shipped as Harmonize in Photoshop desktop/web/mobile (Adobe MAX 2025). Achieved 30% MAU (Monthly Active Users) within one week of release. Widely covered by 40+ news such as CNET, The Verge, TechCrunch, Forbes, ZDNET.
  - Conduct research on generative modeling for image editing tasks including layer decomposition, relighting, image composition, with a focus on controllability and robustness. Published at top-tier conferences (ICCV, CVPR, etc.) and contributed to filed patents on novel generative techniques.
  - Partner with product, engineering, and design teams to translate research prototypes into high-impact AI features used by millions of creatives worldwide.
- 05/2023 **Research Intern**, *Photoshop*, Adobe Inc.  
-12/2023 *Mentors/collaborators: He Zhang, Wei Xiong, Zhixin Shu, Jianming Zhang, Jae Shin Yoon*
- Lighting-aware diffusion model for portrait background replacement and harmonization.
  - Developed the first approach bridging portrait relighting and image harmonization, opening a new research direction of lighting-aware harmonization in image compositing.
  - First-author paper published at CVPR2024.

- 05/2022 **Student Researcher**, *Computational Imaging (Luma) Team*, Google Research  
 -12/2022 *Supervisors: Hossein Talebi, Mauricio Delbracio, Peyman Milanfar*
- Image-conditioned diffusion models for motion deblurring.
  - Improved the domain generalization of the deblurring model towards unseen data with multiscale structure guidance. First-author paper published at ICCV2023.
- 05/2021 **Machine Learning Research Intern**, *PCT REC group*, Siemens Healthineers  
 -09/2021 *Supervisor: Marriappan Nadar*
- Unsupervised susceptibility distortion correction of MR Images.
  - Contributed to the development and enhancement of baseline methods for fast correction of multimodal images, resulting in a filed patent application.
- 05/2019 **Research Assistant**, *Visualization, Imaging and Data Analysis (VIDA) Lab*, NYU  
 -12/2023 *Advisor: Guido Gerig*
- Segmentation-aware feature modulation for unpaired image translation.
  - $Q$ -space conditioned structural to diffusion MRI translation.
  - Spatiotemporal representation learning for longitudinal neuroimage analysis.
  - (Collaborative) Generative adversarial registration towards improved conditional template.
  - (Mentored) Prior regularized data synthesis for microscopy image segmentation.
  - (Mentored) Self-supervised learning for medical image segmentation.
  - (Mentored) Longitudinal brain MR image synthesis.
- 08/2017 **Research Assistant**, *Multimedia and Visual Computing Lab*, NYU Tandon  
 -07/2019 *Supervisor: Yi Fang*
- 3D shape representation learning;
  - Monocular depth estimation;
  - Object detection with multimodal data (RGB image, LiDAR point cloud).

## Publications

- Conference Y Cai, He Zhang, K Zhang, Y Liang, **M Ren**, F Luan, Q Liu, S Kim, J Zhang, Z Zhang, Y Zhou, Y Zhang, X Yang, Z Lin, A Yuille, "Baking gaussian splatting into diffusion denoiser for fast and scalable single-stage image-to-3d generation and reconstruction", International Conference on Computer Vision (**ICCV**), 2025
- J Yang, Q Liu, Y Li, S Kim, D Pakhomov, **M Ren**, J Zhang, Z Lin, C Xie, Y Zhou, "Generative Image Layer Decomposition with Visual Effects", Computer Vision and Pattern Recognition Conference (**CVPR**), 2025.
- S Chaturvedi, **M Ren**, Y Geoffroy, J Liu, J Dorsey, Z Shu, "SynthLight: Portrait Relighting with Diffusion Model by Learning to Re-render Synthetic Faces", Proceedings of the Computer Vision and Pattern Recognition Conference (**CVPR**), 2025.
- N Dey, B Billot, H E Wong, C J Wang, **M Ren**, P Grant, A Dalca, P Golland, "Learning general-purpose biomedical volume representations using randomized synthesis", International Conference on Learning Representations (**ICLR**), 2024.
- J Cha, **M Ren**, KK Singh, H Zhang, Y Hold-Geoffroy, S Yoon, HJ Jung, J Yoon, S Baek, "Text2Relight: Creative Portrait Relighting with Text Guidance", The 38th Annual AAAI Conference on Artificial Intelligence (**AAAI**), 2024.
- M Ren**, W Xiong, J Yoon, Z Shu, J Zhang, H Jung, G Gerig, H Zhang, "Relightful Harmonization: Lighting-aware Portrait Background Replacement", Conference on Computer Vision and Pattern Recognition (**CVPR**), 2024.
- J Yoon, Z Shu, **M Ren**, X Zhang, Y Hold-Geoffroy, KK Singh, H Zhang, "Generative Portrait Shadow Removal", SIGGRAPH Asia, 2024.

Z Yang\*, **M Ren\***, K Ding, G Gerig, Y Wang, "Keypoint-Augmented Self-Supervised Learning for Medical Image Segmentation with Limited Annotation", Thirty-seventh Conference on Neural Information Processing Systems (**NeurIPS**), 2023.

**M Ren**, M Delbracio, H Talebi, G Gerig, P Milanfar, "Multiscale Structure Guided Diffusion for Image Deblurring", International Conference of Computer Vision (**ICCV**), 2023.

**M Ren**, N Dey, M Styner, K Botteron, G Gerig, "Local Spatiotemporal Representation Learning for Longitudinally-consistent Neuroimage Analysis", Thirty-sixth Conference on Neural Information Processing Systems (**NeurIPS**), **oral**, 2022.

**M Ren\***, H Kim\*, N Dey, G Gerig, " $Q$ -space Conditioned Translation Networks for Directional Synthesis of Diffusion Weighted Images from Multi-modal Structural MRI", International Conference on Medical Image Computing and Computer Assisted Intervention (**MICCAI**), **oral**, 2021.

S Li\*, **M Ren\***, T Ach, G Gerig, "Microscopy Image Segmentation via Point and Shape Regularized Data Synthesis", MICCAI DALI workshop, 2023.

G Huang, **M Ren**, G Gerig, X Li, "Identity Preserving Diffusion Model for Brain Aging Modeling", Organization for Human Brain Mapping (**OHBM**) Annual Meeting, 2024.

N Dey, **M Ren**, A Dalca, G Gerig, "Generative Adversarial Registration for Improved Conditional Deformable Templates", International Conference of Computer Vision (**ICCV**), 2021.

J Zhu, Y Shi, **M Ren**, Y Fang, "MDA-Net: Memorable Domain Adaptation Network for Monocular Depth Estimation", British Machine Vision Conference, 2020.

Journal **M. Ren\***, N. Dey\*, J. Fishbagh, G. Gerig, "Segmentation-Renormalized Deep Feature Modulation for Unpaired Image Harmonization", IEEE Transactions on Medical Imaging (**TMI**), 2021.

---

## Patents & Applications

- 08/2025 **High-Quality Guided Image Refinement for Identity Preservation**, *Adobe Inc.*, Filed US Patent
- 07/2025 **Harmonizing Characteristic Sets of Composite Images Using a Generative Network**, *Adobe Inc.*, Filed US Patent
- 06/2025 **Object Peeling-off with Layer Decomposition**, *Adobe Inc.*, Filed US Patent
- 03/2025 **Utilizing Diffusion Models with 3D Gaussian Point Clouds to Generate Multi-View Images from a Digital Image**, *Adobe Inc.*, Filed US Patent
- 03/2025 **Generating Portraits According to Relighting Schemes Using Diffusion Models Trained on Synthetic Image Data**, *Adobe Inc.*, Filed US Patent
- 04/2025 **Systems and Methods for Generative Object Compositing**, *Adobe Inc.*, Filed US Patent
- 09/2024 **Generative Portrait Shadow Removal**, *Adobe Inc.*, Filed US Patent
- 11/2024 **Systems and Methods for Relighted Image Generation**, *Adobe Inc.*, Filed US Patent
- 04/2024 **Generating Digital Images Utilizing a Diffusion-Based Network Conditioned on Lighting-Aware Feature Representations**, *Adobe Inc.*, Filed US Patent

## Awards & Services

- 2019- **Reviewer**, for medical imaging and computer vision conferences/journals
  - Computer vision venues: CVPR, ICCV, ECCV, IJCV, TIP, WACV.
  - Medical imaging venues: ISBI, NeuroImaging, TMI, MedIA, MICCAI.
- 05/2024 **Invited lecture on generative models**, *Cornel Tech*
- 10/2024 **MAX Sneak Presenter**, *Project Perfect Blend*, Adobe MAX 2024 (9/135 selected)
- 04/2024 **Pearl Brownstein Doctoral Research Award**, for “doctoral research which shows the greatest promise”, Tandon School of Engineering, NYU
- 02/2024 **Invited lecture on Image-to-Image models**, *UBC-EECE570-Visual Computing*
- 10/2023 **Doctoral consortium**, ICCV 2023
- 2023-2025 **Organizing committee**, *Women in Computer Vision workshop*, CVPR2024 and CVPR2025
- 01/2023 **Invited talk**, *University of British Columbia (UBC) Trusted and Efficient AI Lab*
- 10/2022 **NeurIPS 2022 Scholar Award**, New Orleans
- 08/2022 **Invited talk**, LUMA seminar, at Perception, Google Research
- 07/2022 **Invited talk**, Computational Neuroimage Science Lab, at Stanford Research Institute
- 2022, 2023 **Guest lecture, deep learning for computer vision**, NYU CS-GY 6643 Computer Vision
- 2020-2021 **Tandon School of Engineering (SOE) Fellowship**, NYU
- 04/2021 **Invited lecture on deep generative models**, NYU CS-GY 6643 Computer Vision
- 04/2021 **CRA-WP Grad Cohort for Women Workshop**, Virtual
- 09/2017 **Shanghai Government Scholarship**, *China*, Top 3%
- 09/2016 **Academic Excellence Scholarship**, *ECNU*, Top 4%