Aashish Rai

Providence, Rhode Island
✉ aashish@brown.edu • aashishrai3799.github.io

EDUCATION

- **Brown University** — **Providence, RI**
  Ph.D. in Computer Science — *Aug 2023 – May 2028*
  Advisor: Srinath Sridhar

- **National Institute of Technology** — **Surat, India**
  B.Tech in Electronics & Communication Engineering — *Aug 2017 – June 2021*

RESEARCH EXPERIENCE

- **Brown University** — **Providence, RI**
  Graduate Research Assistant — *Aug 2023 – Present*
  Advisor: Srinath Sridhar
  - Leveraging large reconstruction models and video models to build a feed-forward generative world model for 3D/4D scenes.
  - Built a new volumetric video representation that packs 3D Gaussian attributes into a sequence of UV atlases for efficient streaming and storage.
  - Captured the largest multi-view video dataset with large motions, and disocclusions. It provides 360 coverage from 50+ synchronized cameras.
  - Investigating neural rendering techniques to improve volumetric video compression and streaming efficiency.
  - Proposed EgoSonics, a conditional diffusion-based framework to generate semantically aligned and synchronized audio tracks for silent egocentric videos (WACV 2025).

- **Meta Reality Labs** — **Burlingame, CA**
  Researcher/Intern — *May 2024 – Dec 2024*
  Host: Aayush Prakash
  - Proposed **UVGS**, a novel 2D representation to solve permutation invariance and the unstructured nature of 3D Gaussian Splatting primitives.
  - Enabled the direct application of existing 2D image generative models (VAEs, Diffusion) to 3D Gaussian Splatting, significantly reducing training overhead (CVPR 2025).

- **Carnegie Mellon University** — **Pittsburgh, PA**
  Research Assistant — *Sept 2021 – May 2023*
  Advisor: Fernando De la Torre
  - **Generative 3D Faces:** Developed a framework to generate photorealistic 3D faces by leveraging 2D generative priors. Demonstrated applications in semantic manipulation and text-based 3D editing.
  - Achieved State-of-the-Art (SOTA) performance in 3D shape reconstruction and identity preservation (WACV 2024).
  - **Disentangled Representations:** Built a 3D face generative model to decouple identity from expression, enabling granular control over facial animation (WACV 2023).

- **McGill University** — **Montreal, Canada (Remote)**
  Research Intern — *May 2020 – Mar 2021*
  Advisor: Jeremy Cooperstock
  - Improved Semantic Face Editing by manipulating the latent space of StyleGAN2.
  - Proposed an automated method for feature disentanglement in latent space via orthogonal projection (ICMLA 2021).

- **Norwegian Biometrics Laboratory, NTNU** — **Norway (Remote)**
  Undergraduate Researcher — *Dec 2019 – May 2020*
  Advisors: Kishor Upla, Christoph Busch
  - Designed an efficient face super-resolution model using a progressive residual CNN network (IWBF 2020).
  - Outperformed benchmark datasets CelebA (PSNR: 26.55) and LFW (PSNR: 26.26).

PUBLICATIONS

- **A. Rai**, A. Xing, A. Agarwal, X. Cong, Z. Li, T. Lu, A. Prakash, S. Sridhar. *"PackUV: Packed Gaussian UV Maps for 4D Volumetric Video"*, **2026**.
- **A. Rai**, D. Wang, M. Jain, N. Sarafianos, A. Chen, S. Sridhar, A. Prakash. *"UVGS: Reimagining Unstructured 3D Gaussian Splatting using UV Mapping"*. **CVPR 2025**. [**Project Page**]
- **A. Rai**, S. Sridhar. *"EgoSonics: Generating Synchronized Audio for Silent Egocentric Videos"*. IEEE/CVF Winter Conference on Applications of Computer Vision, **WACV 2025**. [**Project Page**]
- **A. Rai**, H. Gupta, A. Pandey, F. V. Carrasco, S. J. Takagi, A. Aubel, D. Kim, A. Prakash, F. de la Torre. *"Towards Realistic Generative 3D Face Models"*. **WACV 2024**. [**Project Page**]
- F. Teherkhani, **A. Rai**, S. Srivastava, Q. Gao, X. Chen, F. de la Torre, S. Song, A. Prakash, D. Kim. *"Controllable 3D Generative Adversarial Face Model via Disentangling Shape and Appearance"*. **WACV 2023**. [**Project Page**]
- **A. Rai**, C. Ducher, J. Cooperstock. *"Improved Attribute Manipulation in the Latent Space of StyleGAN for Semantic Face Editing"*. **ICMLA 2021**. [**Paper**]
- **A. Rai**, V. Chudasama, K. Upla, K. Raja, R. Ramachandra, C. Busch. *"ComSupResNet: A Compact Super-Resolution Network for Low-Resolution Face Images"*. **IWBF 2020**. (Extended version in IEEE Transactions on Biometrics). [**Paper**]

TECHNICAL SKILLS

- **Languages & Frameworks:** Python, C++, CUDA, Parallel Programming, PyTorch, NumPy
- **3D/4D Vision:** Gaussian Splatting (3DGS, 4DGS), NeRF, Neural Rendering, Volumetric Reconstruction, Multiview Geometry, Camera Estimation, Differentiable Rendering, Optical Flow, COLMAP
- **Generative AI:** Diffusion Models (DDPM, DDIM, 3D Diffusion), World Models, Large Language Models (LLMs), Multimodal Learning, GANs, Face Generation, Video Generation
- **Core Competencies:** 3D/4D Computer Vision, Stereo & Volumetric Reconstruction, Free-viewpoint Video, Deep Learning, Large Dataset Curation