# Liujie Zheng

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## Education

- **University of North Carolina at Chapel Hill** — Chapel Hill, NC
  **B.S. in Computer Science, B.S. in Statistics and Analytics, Minor in Studio Art** — Aug 2020 - Dec 2024
  - **GPA**: 3.89 | Dean's List

## Work Experience

- **University of North Carolina at Chapel Hill** — Chapel Hill, NC
  **Undergraduate Research Assistant at Graphics & Virtual Reality Group** — Sep 2022 - Present
  - **Advisors**: Dr. Henry Fuchs and Dr. Praneeth Chakravarthula
  - **Research Focus**:
    - Real-time human novel view synthesis.
    - Visually-informed novel view synthesis in acoustics.

## Research Experience

- **Desktop Telepresence System with 3D Gaussian Splatting** — Chapel Hill, NC
  **Advisors: Dr. Henry Fuchs and Dr. Roni Sengupta (she/her)** — Sep 2022 - Present
  - **Real-time Novel View Synthesis**: Designed and implemented a real-time novel view synthesis pipeline for humans based on 3D Gaussian Splatting for the desktop telepresence system.
  - **U-Net Video Autoencoder**: Designed and implemented a U-Net-based autoencoder tailored for video processing in the study of memory-augmented neural networks.
- **Novel View Synthesis in Acoustics** — Chapel Hill, NC
  **Advisor: Dr. Praneeth Chakravarthula** — May 2023 - Present
  - **Neural Binaural Audio Synthesis**: Propose a hybrid model incorporating acoustic synthesis blocks and a Head-Related Transfer Function (HRTF) module to learn the transfer function that represents the binaural audio effects.
  - **Depth Estimation**: Implemented a depth estimation pipeline to enhance the existing Replay dataset.

## Publications

- **Visually-Informed Neural Binaural Audio Synthesis**
  Guansen Tong*, **Liujie Zheng***, Haosheng Shi*, Shengze Wang, Grace Fei, Praneeth Chakravarthula
  Under Review *SIGGRAPH 2024*
- **Bringing Telepresence to Every Desk**
  Shengze Wang, Ziheng Wang, Ryan Schmelzle, **Liujie Zheng**, YoungJoong Kwon, Roni Sengupta, Henry Fuchs
  Under Review *TVCG 2024* [arXiv] [website]

## Projects

- **Voice to Image Generation on VR** — Dec 2023
  - **Voice to Image Pipeline**: Developed a voice-to-text-to-image pipeline using the Hugging Face Unity API, enabling rapid image generation from vocal inputs.
  - **Mixed Reality**: Engineered immersive mixed reality experiences using the Unity Engine. This included implementing locomotion, object interaction, and gesture tracking features on Meta Quest 3.
- **Face to BMI Prediction** — May 2023
  - **Data Augmentation**: Implemented data augmentation techniques in PyTorch to enhance the dataset, resulting in a 14% increase in model accuracy and robustness across various conditions.
  - **Feature Extraction**: Applied the Vision Transformer model in PyTorch for facial feature extraction, surpassing state-of-the-art benchmarks on the VisualBMI dataset as of May 2023 by 39.5%.
- **Panorama Stitching** — Feb 2023
  - **Feature Detection**: Implemented scale-invariant feature transform detector to detect and describe features in input images with OpenCV.
  - **Image Alignment and Blending**: Implemented random sample consensus technique for feature matching. Aligned and blended the input images to stitch a panorama with OpenCV.

## Teaching Experiences

- **University of North Carolina at Chapel Hill** — Chapel Hill, NC
  - **Learning Assistant**: Computer Vision in 3D World — August 2023 - Dec 2023
  - **Learning Assistant**: Data Structures and Analysis — Jan 2023 - May 2023