SHIYU TAN

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Education

Ph.D. **Rice University**, Houston,TX — 2018—May 2023 (expected)
Electrical and Computer Engineering, GPA: 4.0/4.0

M.S. **University of Chinese Academy of Sciences**, China — June 2015
Optics, major GPA: 92.3/100

B.S. **Jilin University**, China — June 2012
Electrical Engineering, major GPA: 94.0 /100

Research Interests

Computational imaging, Computational display, Computer vision, Deep/Machine learning

Professional Experience

Rice University, ECE department — Sep.2018—present
Research assistant with Dr. Ashok Veeraraghavan

Research on jointly designing optics and reconstruction algorithms using diffractive optical elements or meta-elements. Interest in the applications of 3D imaging in the area of AR/VR and robotics.

- Working on **Single-shot High-dynamic-range 3D Imaging** by jointly optimizing the camera/sensor with the reconstruction algorithms. [Ongoing]
- Working on **Meta Optical Foveated Thermal Lens.** Metalens that has high resolution, small field-of-view (FoV) for the central part of the image and low resolution, large FoV for the rest. [paper submitted]
- Worked on **Monocular Metalens 3D sensor**. Exploited the extreme chromatic dispersion in optical metasurfaces to design a single camera that can capture texture/depth information, simultaneously. [2]
- Worked on **3D Cross-modality Microscopy** of thick scattering samples. Used a deep neural network to digitally predict confocal images from the measurements of wide-field microscopes. [3]

Meta Reality Labs — June.2022—present
Optical scientist intern with Dr. Yijing Fu and Dr. Bennett Wilburn at AR team, Redmond

Worked on **Waveguide-based AR glasses uniformity correction using a light field camera.** Designed and prototyped sub-aperture array based light field imaging system for fast and accurate waveguide uniformity characterization. [Paper in preparation]

Rice University & Facebook Reality Labs — Jan.2019—Aug.2021
Research collaboration with Dr. Shoou-I Yu at VR team, Pittsburgh

Worked on **Large Depth-of-field Stereo-based 3D imaging.** Designed and prototyped large-aperture, large depth-of-field cameras for stereo systems, enabling fast motion capture under limited light condition. [1]

University of California, Berkeley Sep.2016—May.2018
Visiting Scholar with Dr. Ming Gu

Worked on **High-efficiency Optical Modeling and Reconstruction**. Developed an interpolated calibration method and a blocked-FFT imaging model for large FoV imaging.

Chinese Academy of Sciences Sep.2013—Sep.2016
Research assistant/Research engineer with Dr. Shensheng Han

Worked on **Compressive Hyperspectral Imaging**. Proposed a compressive imaging system that can capture spectral images in a snapshot. Worked with the opto-mechanical team, electrical engineering team and balloon-borne team on prototyping and outfield experiments.[4-8]

Selected Publications

1. **Shiyu Tan***, Yicheng Wu*, Shoou-I. Yu, and Ashok Veeraraghavan. "CodedStereo: Learned Phase Masks for Large Depth-of-field Stereo." *CVPR*, 2021. **(oral)**
2. **Shiyu Tan**, Frank Yang, Vivek Boominathan, Ashok Veeraraghavan, and Gururaj V. Naik. "3D Imaging Using Extreme Dispersion in Optical Metasurfaces." *ACS Photonics*, 2021.
3. Bowen Li, **Shiyu Tan**, Jiuyang Dong, Xiaocong Lian, Yongbing Zhang, Xiangyang Ji*, Ashok Veeraraghavan*. "Deep-3D Microscope: 3D volumetric microscopy of thick scattering samples using a wide-field microscope and machine learning." *Biomedical Optics Express*, 2021.
4. Jianrong Wu, Enrong Li, Xia Shen, Siyi Yao, Zhishen Tong, Chenyu Huang, Zhentao Liu, Shengying Liu, **Shiyu Tan**, and Shensheng Han. "Experimental results of the balloon-borne spectral camera based on ghost imaging via sparsity constraints." *IEEE Access*, 2018 (6).
5. Zhentao Liu*,**Shiyu Tan***, Jianrong Wu, Enrong Li, Xia Shen, and Shensheng Han. "Spectral Camera based on Ghost Imaging via Sparsity Constraints." *Scientific Reports*, 2016 (6).
6. Zhentao Liu, **Shiyu Tan**, Jianrong Wu, Enrong Li, and Shensheng Han. "The Study of Spectral Camera based on Ghost Imaging via Sparsity Constraints with Sunlight Illumination." *CLEO*, 2016.
7. Jianrong Wu, Zhentao Liu, **Shiyu Tan**, Enrong Li, Xia Shen, Shengying liu, and Shensheng han. "Computational spectral imaging based on random modulation and compressed sensing reconstruction algorithm." *LACSEA*, 2016.
8. **Shiyu Tan**, Zhentao Liu, Enrong Li and Shensheng Han. "Hyperspectral Compressed Sensing Based on Prior Images Constrained." *Acta Optica Sinica*, 2015, 35(8).
9. **PATENT**: "Compressive Broadband Hyperspectral Imaging System Based on Random Grating." granted 2016, WO2016011675.

Awards & Fellowships

John Clark, Jr. Fellowship Award, *Rice University* 2018
Outstanding Student Award (top 10%), *Chinese Academy of Sciences* 2013
Undergraduate Research Award, *Chinese Academy of Sciences* 2012
Outstanding Student Leader Award, *Jilin University* 2010
Outstanding Student Award (top 10%), *Jilin University* 2009—2012

Teaching & Services

Teaching assistance, *ELEC/COMP 447/546: Introduction to Computer Vision* Spring 2021
Teaching assistance, *ELEC 549: Computational Photography* Spring 2020
Reviewer for IEEE Trans. Image Processing (TIP)

Skills

Python (TensorFlow, Pytorch, OpenCV), Matlab, Fortran; Nanoscribe, RealityCapture, KLayout