Yi Hua

A painter who builds novel cameras.

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RSEARCH INTERESTS
- Computational Photography
- Lensless Imaging
- 3D Reconstruction
- Depth Imaging
- Camera Calibration
- Creative Tools

EDUCATION

Carnegie Mellon University
Ph.D., Electrical & Computer Engineering, Nov. 2022 (expected).
M.S., Computer Vision, Dec. 2016.

Rice University
B.S., Computer Science; minor in Mathematics, May 2015.

AWARDS

Carnegie Institute of Technology Dean's Fellow, 2017

People's Choice Award at HackRice, 2015

EXPERIENCES

Carnegie Mellon University, Image Science Lab, 2017-present
Ph.D. student, advisor: Prof. Aswin C. Sankaranarayanan
- Physics-based differential rendering for 3D lensless imaging
- Programmable lensless imagers for better 3D imaging quality
- Deformable lensless imager with on the sphere and curved surfaces

Google Daydream, summer 2018
Software engineering intern
- Trained cross-spectral (RGB - infrared) matching network for trinocular stereo
- Improves high-resolution depth estimation of specular objects for Project Starline

Meta Reality Labs Research (formerly Occulus Research), 2016
Capstone project
- Built a robotic calibration system for camera to IMU calibration
- Improves headset pose estimate frame rate from camera-only system

Apple Special Project Group, summer 2016
Software engineering intern

Rice University Computer Vision Lab, 2014
Student researcher
- Built a multi-camera system for accurate indoors human detection

Heidelberg Collaboratory for Image Processing (Germany), summer 2013
DAAD RISE research intern
- Created tools for 2D to 3D film conversion by classifying depth edges with random forest

PUBLICATIONS

Yi Hua, M. Salman Asif and Aswin C. Sankaranarayanan, *Lensfree Z-Stacking: A Theory of Volumetric Convolution for Lensless Cameras*, under review at SIGGRAPH ASIA, 2022

Hossein Baktash, Yash Belhe, Yi Hua, Matteo Giuseppe Scopelliti, Aswin C. Sankaranarayanan, Maysam Chamanzar, *Computational Imaging using Ultrasonically-Sculpted Virtual Lenses*, Intl. Conf. Computational Photography (ICCP), 2022.

Yucheng Zheng, Yi Hua, Aswin C. Sankaranarayanan and M. Salman Asif, *A Simple Framework for 3D Lensless Imaging with Programmable Masks*, in ICCV, 2021.

Yi Hua, Shigeki Nakamura, M. Salman Asif and Aswin C. Sankaranarayanan, *SweepCam — Depth-aware Lensless Imaging using Programmable Masks*, in Trans. Pattern Analysis and Machine Intelligence (TPAMI) / ICCP 2020.

COURSES

Carnegie Mellon University
Computer Vision (A), Geometry-based Methods in Vision (A), Physics-based Methods in Vision (A-), Visual Learning & Recognition (A), Adv. Computer Vision Apps (A), Applied Stochastic Processes (A), Estimation Detection & Identification (A), Convex Optimization (A), Linear Systems(A), Discrete Differential Geometry (A)

Rice University
Honors Linear Algebra (A), Statistical Machine Learning (A-), Modern Physics (A), Adv. Computer Graphics (A), Life Drawing (A), Sculpture (A), Intro. Film-making & Editing (A)

TEACHING ASSISTANT

Electrical & Computer Engineering, Carnegie Mellon University
Mathematical Foundations of Electrical Engineering, 2019; Signal and Systems, 2018; Image and Video Processing, 2018

Computer Science, Rice University
Parallel Computing, 2015; Intro. to Program Design, 2014; Algorithmic Thinking, 2014

ACADEMIC SERVICE

Review for journals and conferences
IEEE Transactions on Computational Imaging, Optics Express, CVPR 2022, ECCV 2022

PROJECTS

Peel: Style Transfer App on Android , 2015
An app that let you ”peel” a color filter from a photo you like and apply it to your photo

We put food on your plate: Augmented Reality App on Android , 2014
An app that augments empty plates detected from camera with food

SKILLS

Programming
Python, C++, MATLAB, Java; PyTorch, Tensorflow, OpenCV, ROS

Fabrication
SolidWorks, laser cutting, 3D printing, crochet

Artistic
Watercolor painting, animated illustration (hawaiiiwatercolor.tumblr.com)