

# Yi Hua

A painter who builds novel cameras.



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hawaii.github.io

RESEARCH • Computational Photography • Lensless Imaging • 3D Reconstruction  
INTERESTS • Depth Imaging • Camera Calibration • Creative Tools

EDUCATION **Carnegie Mellon University**  
Ph.D., Electrical & Computer Engineering, Jan. 2023 (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 Oculus 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	<p>Yi Hua, M. Salman Asif and Aswin C. Sankaranarayanan, <i>Spatial and Axial Resolution Limits for Mask-based Lensless Cameras</i>, Optics Express, 2022.</p> <p>Hossein Baktash, Yash Belhe, Matteo Giuseppe Scopelliti, Yi Hua, Aswin C. Sankaranarayanan, Maysamreza Chamanzar, <i>Computational Imaging using Ultrasonically-Sculpted Virtual Lenses</i>, Intl. Conf. Computational Photography (ICCP), 2022.</p> <p>Yucheng Zheng, Yi Hua, Aswin C. Sankaranarayanan and M. Salman Asif, <i>A Simple Framework for 3D Lensless Imaging with Programmable Masks</i>, in ICCV, 2021.</p> <p>Yi Hua, Shigeki Nakamura, M. Salman Asif and Aswin C. Sankaranarayanan, <i>SweepCam — Depth-aware Lensless Imaging using Programmable Masks</i>, in Trans. Pattern Analysis and Machine Intelligence (TPAMI) / ICCP 2020.</p>
COURSES	<p><b>Carnegie Mellon University</b>  Computer Vision (A), Geometry-based Methods in Vision (A), Physics-based Methods in Vision (A-), Visual Learning &amp; Recognition (A), Adv. Computer Vision Apps (A), Applied Stochastic Processes (A), Estimation Detection &amp; Identification (A), Convex Optimization (A), Linear Systems(A), Discrete Differential Geometry (A)</p> <p><b>Rice University</b>  Honors Linear Algebra (A), Statistical Machine Learning (A-), Modern Physics (A), Adv. Computer Graphics (A), Life Drawing (A), Sculpture (A), Intro. Film-making &amp; Editing (A)</p>
TEACHING ASSISTANT	<p><b>Electrical &amp; Computer Engineering, Carnegie Mellon University</b>  Mathematical Foundations of Electrical Engineering, 2019; Signal and Systems, 2018; Image and Video Processing, 2018</p> <p><b>Computer Science, Rice University</b>  Parallel Computing, 2015; Intro. to Program Design, 2014; Algorithmic Thinking, 2014</p>
ACADEMIC SERVICE	<p><b>Review for journals and conferences</b>  IEEE Transactions on Computational Imaging; Optics Express  CVPR 2022, 2023; ECCV 2022</p>
PROJECTS	<p><b>Peel: Style Transfer App on Android</b> , 2015  An app that let you "peel" a color filter from a photo you like and apply it to your photo</p> <p><b>We put food on your plate: Augmented Reality App on Android</b> , 2014  An AR menu app that augments empty plates detected from camera with food</p>
SKILLS	<p><b>Programming</b>  Python, C++, MATLAB, Java; PyTorch, Tensorflow, OpenCV, ROS</p> <p><b>Fabrication</b>  SolidWorks, laser cutting, 3D printing, crochet</p> <p><b>Artistic</b>  Watercolor painting, animated illustration (<a href="http://hawaiiwatercolor.tumblr.com">hawaiiwatercolor.tumblr.com</a>)</p>